

# ASSESSMENT OF INVASIVENESS AND ECOLOGICAL IMPACT IN NON-NATIVE PLANTS OF TEXAS

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## ABSTRACT

An documented account of 812 non-native species reported to grow outside of cultivation in Texas has been developed. About 300 of these have been reported since the 1970 publication of the *Manual of the Vascular Plants of Texas*, and each of the latter taxa has been documented by at least a literature reference. A “Fundamental Invasiveness Index” provides a framework for assessment and ranking of each of the non-native species according to their invasiveness and ecological impact. The Index is based on knowledge of the species from field, herbarium, and literature, according to the following criteria.

**F1:** Invasive in both disturbed and natural habitats, negatively affecting native species or natural biodiversity by altering native vegetation and habitats or by outcompeting or hybridizing with native species; or, invasive into agricultural habitats and causing significant economic damage; including woody, herbaceous, and aquatic species.

**F2:** Abundant in number and widespread, commonly invasive in disturbed habitats, much less commonly in natural habitats; subdivided into woody, herbaceous, and aquatic species.

**F3:** Relatively few in number, known from relatively few localities, usually in disturbed habitats; subdivided into woody and herbaceous species.

**F4:** Status unknown.

Numbers of species per category are **F1-Woody, Herbaceous, and Aquatic** (51), **F2-Woody** (13), **F2-Herbaceous** (228), **F2-Aquatic** (16), **F3-Woody** (76), **F3-Herbaceous** (348), and **F4** (80). A Watch List includes 52 woody, herbaceous, and aquatic species most likely to warrant F1 ranking.

## RESUMEN

Se realiza un informe documentado de 812 especies no nativas que crecen fuera de cultivo en Texas. Unas 300 de ellas se han citado desde la publicación en 1970 del *Manual of the Vascular Plants of Texas*, y cada uno de estos últimos taxa se ha documentado con al menos una referencia bibliográfica. Un “Fundamental Invasiveness Index” ofrece un marco para la evaluación y ordenación de cada una de las especies no nativas de acuerdo a su potencial invasor e impacto ecológico. El índice está basado en el conocimiento de las especies en el campo, herbario, y bibliografía, de acuerdo a los siguientes criterios.

**F1:** Invasiva tanto en hábitats modificados y naturales, que afecta negativamente a especies nativas o a la biodiversidad natural por alterar la vegetación nativa y hábitats o por competir o hibridar con especies nativas; o, invasoras en hábitats agrícolas causando daños económicos importantes; incluyendo especies leñosas, herbáceas, y acuáticas.

**F2:** Abundantes en número y extendidas, generalmente invasivas en hábitats alterados, mucho menos en hábitats naturales; subdivididas en especies leñosas, herbáceas, y acuáticas.

**F3:** Relativamente pocas en número, conocidas de relativamente pocas localidades, usualmente en hábitats alterados; subdivididas en especies leñosas y herbáceas.

**F4:** Estatus desconocido.

Los números de especies por categoría son **F1-leñosas, herbáceas, y acuáticas** (51), **F2-leñosas** (13), **F2-herbáceas** (228), **F2-acuáticas** (16), **F3-leñosas** (76), **F3-herbáceas** (348), y **F4** (80). Una lista visual incluye 52 especies leñosas, herbáceas, y acuáticas que probablemente justifican una situación en F1.

About 516 non-native species were known 40 years ago to occur outside of cultivation in Texas (as counted from Correll & Johnston 1970)—about 11 percent of the total flora of the state at that time. Since that time, about 300 additional introductions to the state have been reported in various publications (summarized in the PLANTS Database: USDA, NRCS 2009; the PLANTS Database has drawn its information from a variety of sources, including major publications on the Texas flora). The present paper provides a summary account of the currently known non-native Texas flora, with documentation for those species included in



the account since 1970 and a ranking of invasiveness and ecological impact for each species included. The system presented here is simple enough to allow a quick assessment of a large number of species but still to provide a fundamental overview of each species.

Various lists of invasive species have been developed for Texas, but documentation for these lists is not readily available. The most comprehensive list is presented by TexasInvasives.org (2009), which includes 139 species, with a photo for each and a listing of the family, common name, duration, habit, and information on morphology, biology, and distribution, including links to detailed Texas maps. Two lists have state-wide legal standing: the Noxious Plant List of the Texas Department of Agriculture (TDA 2009) with 29 species and a list of Prohibited Exotic Species from the Texas Parks and Wildlife Department (TPWD 2009) with 19 aquatic species. The list of 13 aquatic species from the North Texas Water Garden Society (NTWGS 2009) appears to be a subset of the TDA list. The City of Austin lists 26 species (some listed simply as the genus) of Invasive Plants to Avoid (Austin City Connection 2009).

The Invaders of Texas (2009) program organizes teams of local citizen scientists who seek out and report occurrences of invasive species. This is a very useful program, both practically and scientifically—as of May 2009, more than 7400 detailed field observations have been reported and are available online. Each field report includes precise locality information (with coordinates automatically mapped), an indication of abundance at the locality, and usually a photo of the plant or populations taken at the site of observation. The target species sought by the Invaders of Texas participants are the 139 on the TexasInvasives.org list (2009). For each species, individual field observations are mapped in aggregate to show their total distribution in the state.

#### **Non-native species in Texas—development of a list and documentation.**

A preliminary list of non-native species in Texas was developed by the author from the PLANTS Database (USDA, NRCS 2009), using an Advanced Search for Texas taxa introduced to the Lower 48 states. Journals and other literature were reviewed for possible additions, and a number of species have been excluded. Identifications in the Texas list presented here often are not made to infraspecific rank (in contrast to the PLANTS list), because vouchers commonly have not been examined or because the validity of the infraspecific taxonomy is not clear. Only plants that are naturalized have been included (vs. cultivated or persisting from cultivation), though some on the list probably would best be characterized as waifs (Nesom 2000) if follow-up observations were done at sites where they were reported to occur. Whether or not a species is native sometimes may be difficult to judge—generally such instances are discussed in the documentation for the full list (Nesom 2009a).

Documentation for the occurrence of these species in Texas (Nesom 2009a) begins with literature and other records that have been published mostly after 1970, the date of publication of Correll and Johnston's "*Manual of the Vascular Plants of Texas*," which remains the primary floristic resource for the state. In the course of assigning invasiveness rankings, however, the rationale for inclusion of each species on the full list has been examined. For species included in the documentation, at least one full literature reference is provided, with reported Texas counties and other brief notes on the status of the species, as appropriate or as known. Many taxa on the PLANTS list or from elsewhere have been excluded from the Texas flora because of mistaken or faulty documentation (Nesom 2009b for examples from the Asteraceae), and these are specifically noted in the commentaries (Nesom 2009a). A number of species have been reported simply by listing (Johnston 1990; Hatch et al. 1990) or by mapping (Turner et al. 2003); vouchers or other documentation for these are being provided.

Documentation for the full list of non-native taxa is an essential and critical part of both this process and this report. Because the information is complex and completion and supplementation are ongoing, it remains as an online resource (Nesom 2009a). Addition of voucher information and other documentation for species first reported in lists by Johnston (1990) and Hatch et al. (1990) and elsewhere will be a significant advance.



### Systems for assessment and ranking of invasiveness.

In developing a protocol for evaluating Texas non-native species for invasiveness and ecological impact, a representative set of other systems toward the same end has been considered and studied.

- \* Alien Plants Ranking System (Ver. 5.1) (APRS Implementation Team 2000)
- \* Ranking Invasive Exotic Plant Species in Virginia (Heffernan et al. 2001)
- \* Criteria for Categorizing Invasive Non-Native Plants that Threaten Wildlands (Warner et al. 2003)
- \* An Invasive Species Assessment Protocol: Evaluating Non-native Plants for Their Impact on Biodiversity (Morse et al. 2004)
- \* Invasiveness Ranking System for Non-native Plants of Alaska (Carlson et al. 2008)
- \* New York State Plant Ranking System for Evaluating Non-Native Plant Species for Invasiveness (DRAFT) (Jordan et al. 2009).

Perhaps the most widely applied (and adapted) of these is Morse et al. (2004), developed by NatureServe, in collaboration with The Nature Conservancy and the U.S. National Park Service. It is a “protocol for assessing and categorizing non-native plants according to their impacts on native biodiversity.” NatureServe Explorer now includes an impact rank (“I-rank”—high, medium, low, or insignificant) for many non-native plant species of the USA.

In each of the systems above, assessment and ranking of an individual species invokes a series of detailed questions grouped into a set of topics, usually including some or all of these:

- \* ecological impact and potential for future impact;
- \* biological attributes, including dispersal ability and invasiveness potential;
- \* ecological amplitude;
- \* geographic extent of invasion; and
- \* control/management feasibility and cost.

A significant amount of the information required for the ranking criteria is drawn from literature pertinent to the species under consideration. After scoring is complete for the whole set of questions, the species may be ranked numerically by its additive score, or the additive score may translate to a broader category.

The ranking protocol for the Tennessee Invasive Exotic Plant List (Tennessee EPPC 2001) is considerably different from those above. In the Tennessee system, a species is assigned by a committee of biologists to one of the following categories (the number of Tennessee species in each category is indicated):

- Rank 1—Severe Threat:** Exotic plant species that possess characteristics of invasive species and spread easily into native plant communities and displace native vegetation. (29 species)
- Rank 2—Significant Threat:** Exotic plant species that possess characteristics of invasive species but are not presently considered to spread as easily into native plant communities as those species listed as Rank 1. (49 species)
- Rank 3—Lesser Threat:** Exotic plant species that spread in or near disturbed areas; and are not presently considered a threat to native plant communities. (28 species)
- Watch List A—**Exotic plants that naturalize and may become a problem in the future; includes species that are or could become widespread in Tennessee. At this time more information is needed, and there is no consensus about their status. (24 species)
- Watch List B—**Exotic plant species that are severe problems in surrounding states but have not been reported in Tennessee. (6 species)

The protocol proposed here for Texas non-native species is very similar to the one developed for Tennessee.

### Invasiveness and ecological impact of Texas non-native species.

The system outlined here for use in Texas emphasizes simplicity, allowing assessment of the large number of non-native species (all that are known to occur in the state). Because essential elements of biology and geography are included in the assessments, the system is termed the Fundamental Invasiveness Index. After becoming familiar with the categories of the index and the characteristics of the species under consideration, the species is assigned to one of the categories. The first category (F1) applies to species that have invasive biological characteristics as well as a strong and adverse impact on natural systems and biodiversity (or an adverse economic impact). The other two main categories (F2, F3) include species that are less significant



in ecological or economic impact, with the division between species of F2 and F3 made on the basis of their geographic distribution, abundance, and potential for spread. Within F2 and within F3, slightly different characterizations are given for woody and herbaceous species, as the two growth forms are generally distinct in biology.

The biology of aquatic species is distinct from terrestrial ones, in part because of their potential for extremely rapid dispersal in local aquatic systems. Emergents that grow in open water—sometimes persisting in mud flats or in periodically wet habitats (i.e., *Alternanthera*, *Ludwigia*, *Nasturtium*)—are included as aquatics. Each species has the potential to cause major ecosystem damage, and many of them already are recognized as noxious over wide regions; others are ecologically damaging at least locally in the lake or stream where they occur. Somewhat arbitrarily, aquatic species are recognized here in the category of maximum negative effect if they occur in 10 or more counties (as recorded by herbarium voucher specimens, expert sightings or photos, or other reliable documentation). *Hydrilla verticillata* is vouchered by specimens at TEX for only about six Texas counties but clearly occurs more widely (as do some of the other species). Otherwise, aquatic species known to occur in 9 or fewer counties all are placed in the same category.

A ranking system such as that from NatureServe provides assessments based on array of explicit and detailed criteria. For Texas and its large number of non-native species, contemplation of such an intricate system and the massive amount of time required for its completion perhaps has inhibited even the beginning of one. The system here, however, appears to provide a realistic overview of the situation in Texas, even though many assessments remain to be clarified for species currently included. Further, the current account at least provides a basis from which more detailed assessments may be developed.

For accurate evaluation of an individual species, knowledge is required of the following.

\* **Nativity.** Is the species native or non-native?

\* **Approximate date of introduction in Texas (e.g., pre-1970, 1970s, 1980s, 1990s).** Documentation in the current system does not provide specific information for species introduced before 1970 (those included in Correll & Johnston's Manual of the Vascular Plants of Texas), but for species recorded since that time, dates are evident, as much as possible, in a review posted and periodically updated on the internet (Nesom 2009a).

\* **Current geographic distribution.** Based on distribution maps in Turner et al. (2003), distribution maps generated by data from Invaders of Texas (2009), records from herbaria (primarily those in Texas), and literature.

\* **Ecological/reproductive behavior in Texas and in other regions.** Based on field experience of the author and others, published literature, information from herbarium collections.

\* **Basic habitat and growth form (aquatic or terrestrial, herbaceous or woody).** Based on field experience, published literature, information from herbarium collections.

#### FUNDAMENTAL INVASIVENESS INDEX

**F1**—Invasive in both disturbed and natural habitats. Negatively affecting native species or natural biodiversity by altering native vegetation and habitats or by outcompeting or hybridizing with native species; or, invasive into agricultural habitats and causing significant economic damage. Aquatic species known to occur in 10 or more counties. Woody, herbaceous, and aquatic species. Examples: *Arundo donax*, *Bothriochloa ischaemum* var. *songarica*, *Centaurea melitensis*, *Eichhornia crassipes*, *Ligustrum sinense*, *Lonicera japonica*, *Lygodium japonicum*, *Nandina domestica*, *Salvinia molesta*, *Sorghum halepense*, *Triadica (Sapium) sebifera*, *Ulmus pumila*.

**F2**—Abundant in number and widespread, commonly invasive in disturbed habitats, much less commonly in natural habitats (Table 1).

**F2-Woody**—Trees, shrubs, subshrubs, and woody vines. Abundant in number and widespread, commonly invasive in disturbed habitats such as roadsides, fencerows, woods edges, and others, sometimes potentially or incipiently damaging in natural habitats (as F1). Examples: *Albizia julibrissin*, *Morus alba*, *Nicotiana glauca*, *Poncirus trifoliata*, *Pyrus calleryana*, *Vitex agnus-castus*.

**F2-Herbaceous**—Annual and perennial herbs and grasses. Known invasive and/or clearly expanding in geographic range, primarily in lawns, roadsides, and other open, disturbed habitats, sometimes in croplands, widespread and usually abundant but often produc-



TABLE 1. Numbers of non-native species in Texas ranked as F1, F2, F3, and F4. The total is 812 species.

|    | Woody | Herbaceous | Aquatic | TOTAL |
|----|-------|------------|---------|-------|
| F1 | 17    | 25         | 9       | 51    |
| F2 | 13    | 228        | 16      | 258   |
| F3 | 76    | 348        |         | 424   |
| F4 | 0     | 80         |         | 80    |

ing relatively little biomass. Not significantly affecting native species or natural biodiversity or otherwise strongly altering native vegetation and habitats. Examples: *Avena sativa*, *Bellardia trixago*, *Coronilla varia*, *Daucus carota*, *Duchesnia indica*, *Erodium cicutarium*, *Galium aparine*, *Gamochaeta coarctata*, *Hypochaeris microcephala*, *Lamium amplexicaule*, *Medicago lupulina*, *Stachys floridana*, *Stellaria media*, *Taraxacum officinale*, *Torilis nodosa*, *Trifolium repens*, *Veronica arvensis*, *Vicia sativa*.

**F2-Aquatic**—Aquatic species known to occur in 1 to 9 counties.

**F3**—Relatively few in number, known from relatively few localities, usually in disturbed habitats.

**F3-Woody**—Trees, shrubs, subshrubs, and woody vines. Relatively few in number, known from relatively few localities, usually in disturbed habitats, repeatedly introduced or perhaps merely long-persisting at some localities, not showing aggressively invasive tendencies, or perhaps incipiently invasive. Examples: *Ardisia crenata*, *Buddleja lindleyana*, *Cinnamomum camphora*, *Hibiscus syriacus*, *Koeleria elegans*, *Manihot esculenta*, *Photinia serratifolia*, *Pistacia chinensis*, *Pyracantha koidzumii*, *Pyrus communis*, *Rosmarinus officinalis*.

**F3-Herbaceous**—Annual and perennial herbs and grasses. Occurrence outside of cultivation known from only one or a few populations, usually in disturbed habitats. Apparently showing little or no increase of abundance or geographic range since the initial report. Examples: *Cichorium intybus*, *Gomphrena globosa*, *Phyllanthus fraternus*, *Plantago coronopus*. Or in some species, sporadically appearing from repeated introductions and not reproducing. Examples: *Citrullus lanatus*, *Consolida orientalis*, *Ipomoea batatas*, *Luffa aegyptiaca*, *Narcissus pseudonarcissus*, *Tagetes erecta*.

**F4**—Status unknown.

### Watch list: terrestrial non-native species in Texas potentially ranked as F1.

Many of the non-native species in Texas occur only in small areas. Among these are a significant number that have been relatively recently recorded for the state and that are known to be both highly invasive and ecologically destructive in other regions of the United States. These features characterize the species included on the Texas "Watch List" (Appendix 5). These species may be expected to spread in Texas and become ecologically problematic. Some of the woody species, like *Cinnamomum camphora*, *Photinia serratifolia*, *Pistacia chinensis*, and *Vitex agnus-castus* are widely planted and seeds often are nearly ubiquitous around urban areas—each of these species already appears to be spreading into natural habitats. In contrast, species such as *Albizia julibrissin* and *Morus alba* are invasive and occur in large numbers but appear to be more restricted to disturbed habitats or to edges of woods.

An interesting point regarding pantropical maritime species potentially or incipiently invasive in Texas has been raised by Tom Patterson (*South Texas College*, Rio Grande City). "How to classify these new arrivals? For the most part, they have not escaped from cultivation. But they potentially are a threat and I believe they need their own category. After tropical storms South Padre Island receives sea beans, red mangrove fruits, and coconuts. Some of these propagules in the past have produced plants and have been infrequently documented by collections, only later to succumb to a severe freeze. With global warming more of these pantropical maritime species will persist and become naturally adventive to Texas." In this category Patterson includes *Caesalpinia bonduc*, *Canavalia rosea*, *Cassytha filiformis*, *Conocarpus erectus*, *Laguncularia racemosa*, *Rhizophora mangle*, and *Scaveola plumieri*. These are added as a special category in the Watch List (Appendix 5).

### Roadside flora.

The emphasis here on ecological impact to natural habitats is especially significant in Texas, where such a relatively small portion of the land is unaltered and it is critical to protect remaining natural areas. Following



that thought, however, roadsides in Texas are exceptionally significant since they comprise a significant portion of public land in the state and in some places are important in harboring elements of the native flora.

"It's hard to know what to do with roadsides. They're not entirely natural, and sometimes the weediness stops at the fence. Don't you wish you had a time machine and could go back 1000 years (or 100) and see Texas without all of the exotics? I wonder what spring would look like without all the non-native mustards, mints, beans, grasses, etc. What might we have had that is no longer here at all? All that vetch and clover and henbit and shepherd's purse had to replace \*something\*" (Monique Reed, pers. comm.).

## APPENDIX 1

All non-native species known to occur in Texas, with "Fundamental Invasiveness Index" rankings. Species on the "WATCH List" (Appendix 4) are indicated.

**ACANTHACEAE**

**Hygrophila polysperma** (Roxb.) T. Anders.—**F2-Woody**

**Nomaphila stricta** (Vahl) Nees—**F2-Woody**

**Ruellia caerulea** Morong—**F3-Herbaceous**

SYN= Ruellia brittoniana Leonard

**Thunbergia alata** Bojer ex Sims—**F3-Herbaceous**

**ALOACEAE**

**Aloe vera** (L.) Burm. f.—**F3-Herbaceous**

**AMARANTHACEAE**

**Achyranthes aspera** L.—**F3-Herbaceous**

**Alternanthera caracasana** Kunth—**F2-Herbaceous**

**Alternanthera philoxeroides** (Mart.) Griseb.—**F1-Woody**

**Alternanthera pungens** Kunth—**F3-Herbaceous**

**Alternanthera tenella** Colla—**F3-Herbaceous**

SYN= Alternanthera bettzichiana (Regel.) Standl.

**Amaranthus blitum** L.—**F2-Herbaceous**

SYN= Amaranthus viridus auct. non L.

**Amaranthus cruentus** L.—**F3-Herbaceous**

SYN= Amaranthus hybridus var. cruentus (L.) Moq.

**Amaranthus hypochondriacus** L.—**F3-Herbaceous**

**Amaranthus sessilis** (L.) DC.—**F4-Herbaceous**

**Celosia argentea** L.—**F3-Herbaceous**

**Gomphrena globosa** L.—**F2-Herbaceous**

**AMARYLLIDACEAE**

**Amaryllis belladonna** L.—**F3-Herbaceous**

**Habranthus tubispathus** (L'Her.) Traub—**F3-Herbaceous**

SYN= Habranthus texanus (-Herbaceousert) Steud.

**Narcissus jonquilla** L.—**F3-Herbaceous**

**Narcissus pseudonarcissus** L.—**F3-Herbaceous**

**Narcissus tazetta** L.—**F3-Herbaceous**

**ANACARDIACEAE**

**Pistacia chinensis** Bunge—**F3-Woody WATCH**

**Schinus longifolius** (Lindl.) Speg.—**F3-Woody**

**Schinus molle** L.—**F3-Woody WATCH**

**Schinus terebinthifolius** Raddi—**F3-Woody WATCH**

**APIACEAE**

**Ammi majus** L.—**F2-Herbaceous**

**Ammi visnaga** (L.) Lam.—**F3-Herbaceous**

**Anethum graveolens** L.—**F3-Herbaceous**

**Bupleurum lancifolium** Hornem.—**F3-Herbaceous**

**Bupleurum rotundifolium** L.—**F2-Herbaceous**

**Conium maculatum** L.—**F2-Herbaceous**

**Coriandrum sativum** L.—**F3-Herbaceous**

**Cuminum cyminum** L.—**F3-Herbaceous**

**Cyclosporum leptophyllum** (Pers.) Sprague ex Britt. &

Wilson—**F2-Herbaceous**

SYN= Apium leptophyllum (Pers.) F. Muell. ex Benth.

**Daucus carota** L.—**F2-Herbaceous**

**Foeniculum vulgare** P. Mill.—**F3-Herbaceous**

**Hydrocotyle sibthorpioides** Lam.—**F3-Herbaceous**

**Pastinaca sativa** L.—**F3-Herbaceous**

**Petroselinum crispum** (P. Mill.) Nyman ex A.W. Hill—**F3-**

**Herbaceous**

SYN= Apium petroselinum L.

**Scandix pecten-veneris** L.—**F3-Herbaceous**

**Torilis arvensis** (Huds.) Link—**F2-Herbaceous WATCH**

**Torilis nodosa** (L.) Gaertn.—**F2-Herbaceous**

**APOCYNACEAE**

**Catharanthus roseus** (L.) G. Don—**F3-Woody**

SYN= Vinca rosea L.

**Nerium oleander** L.—**F3-Woody**

**Vinca major** L.—**F2-Herbaceous**

**Vinca minor** L.—**F4-Herbaceous**

**ARACEAE**

**Colocasia esculenta** (L.) Schott—**F1-Woody**

SYN= Colocasia antiquorum Schott

**Cryptocoryne beckettii** Thwaites ex Trimen—**F2-Woody**

**Pistia stratioides** L.—**F1-Woody**

**Xanthosoma sagittifolium** (L.) Schott—**F2-Woody**

**ARALIACEAE**

**Hedera helix** L.—**F2-Herbaceous**

**ASCLEPIADACEAE**

**Asclepias curassavica** L.—**F3-Herbaceous**

**Cryptostegia grandiflora** (Roxb. ex R. Br.) R. Br.—**F3-**

**Herbaceous WATCH**

**Periploca graeca** L.—**F3-Herbaceous**

**ASTERACEAE Aster Family**

**Acanthospermum australe** (Loefl.) Kuntze—**F4-Herbaceous**

**Acroptilon repens** (L.) DC.—**F4-Herbaceous**

SYN= Centaurea repens L.

**Anthemis cotula** L.—**F2-Herbaceous**

**Bidens pilosa** L.—**F3-Herbaceous**

SYN= Bidens odorata Cav.

**Carduus acanthoides** L.—**F3-Herbaceous**

**Carduus nutans** subsp. **macrocephalus** (Desf.) Nyman—**F1-**  
**Herbaceous**



- SYN= *Carduus macrocephalus* Desf.  
 SYN= *Carduus nutans* var. *macrocephalus* (Desf.) Boivin  
**Carduus pycnocephalus** L.—F2-Herbaceous WATCH  
**Carthamus lanatus** L.—F3-Herbaceous  
**Carthamus tinctorius** L.—F3-Herbaceous  
**Centaurea cyanus** L.—F2-Herbaceous  
**Centaurea melitensis** L.—F1-Herbaceous  
**Centaurea solstitialis** L.—F4-Herbaceous  
**Cichorium intybus** L.—F2-Herbaceous  
**Cirsium vulgare** (Savi) Ten.—F2-Herbaceous WATCH  
 SYN= *Carduus lanceolatus* L.  
**Cnicus benedictus** L.—F4-Herbaceous  
 SYN= *Centaurea benedicta* (L.) L.  
**Conyza bonariensis** (L.) Cronq.—F2-Herbaceous  
 SYN= *Erigeron bonariensis* L.  
**Cosmos bipinnatus** Cav.—F3-Herbaceous  
**Cosmos sulphureus** Cav.—F3-Herbaceous  
**Cotula australis** (Sieber) Hook. f.—F3-Herbaceous  
**Crepis capillaris** (L.) Wallr.—F4-Herbaceous  
**Crepis pulchra** L.—F3-Herbaceous  
**Crepis setosa** Haller f.—F4-Herbaceous  
**Crepis zacintha** (L.) Babcock—F4-Herbaceous  
**Emilia fosbergii** D.H. Nicols.—F4-Herbaceous  
**Facelis retusa** (Lam.) Schultz-Bip.—F2-Herbaceous  
**Galinsoga parviflora** Cav.—F2-Herbaceous  
 SYN= *Galinsoga parviflora* var. *semicalva* Gray  
**Gamochaeta antillana** (Urb.) Anderb.—F2-Herbaceous  
**Gamochaeta calviceps** (Fern.) Cabrera—F2-Herbaceous  
**Gamochaeta coarctata** (Willd.) Kerg.—F2-Herbaceous  
**Gamochaeta pensylvanica** (Willd.) Cabrera—F2-Herbaceous  
**Hedypnois cretica** (L.) Dum.-Cours.—F2-Herbaceous  
**Hypochaeris brasiliensis** var. *tweediei* (Hook. & Arn.) Baker—F2-Herbaceous  
 SYN= *Hypochaeris tweediei* Hook. & Arn.  
**Hypochaeris glabra** L.—F2-Herbaceous  
**Hypochaeris microcephala** var. *albiflora* (Kuntze) Cabrera—F2-Herbaceous  
**Hypochaeris radicata** L.—F2-Herbaceous  
**Lactuca saligna** L.—F3-Herbaceous  
**Lactuca serriola** L.—F2-Herbaceous  
 SYN= *Lactuca scariola* L.  
**Lapsana communis** L.—F3-Herbaceous  
**Leontodon hispidus** L.—F3-Herbaceous  
**Leontodon taraxacoides** (Vill.) Mérat—F4-Herbaceous  
**Leucanthemum vulgare** Lam.—F2-Herbaceous  
 SYN= *Chrysanthemum leucanthemum* L.  
**Matricaria recutita** L. Wild Chamomile—F4-Herbaceous  
 SYN= *Chamomilla recutita* (L.) Rauschert  
 SYN= *Matricaria chamomilla* var. *coronata* (J. Gay) Coss. & Germ.  
 SYN= *Matricaria suaveolens* L.  
**Onopordum acanthium** L.—F2-Herbaceous  
**Pseudognaphalium luteoalbum** (L.) Hilliard & Burt—F2-Herbaceous  
**Sanvitalia angustifolia** A. Gray—F3-Herbaceous  
**Scorzonera laciniata** L.—F2-Herbaceous  
**Senecio vulgaris** L.—F2-Herbaceous  
**Silybum marianum** (L.) Gaertn.—F3-Herbaceous  
**Soliva anthemifolia** (Juss.)—F2-Herbaceous  
 SYN= *Soliva mutisii* Kunth  
**Soliva sessilis** Ruiz & Pavón—F2-Herbaceous  
 SYN= *Soliva pterosperma* (Juss.) Less.  
**Soliva stolonifera** (Brot.) Sweet—F2-Herbaceous  
 SYN= *Gymnostyles stolonifera* (Brot.) Tutin—  
 SYN= *Gymnostyles nasturtiifolia* Juss.  
**Sonchus asper** (L.) Hill—F2-Herbaceous  
**Sonchus oleraceus** L.—F2-Herbaceous  
**Sphagneticola trilobata** (L.) Pruski—F3-Herbaceous  
 SYN= *Wedelia trilobata* L.  
**Symphotrichum squamatum** (Spreng.) Nesom—F4-Herbaceous  
 SYN= *Aster subulatus* var. *sandwicensis* A. Gray  
**Tagetes erecta** L.—F4-Herbaceous  
**Taraxacum laevigatum** (Willd.) DC.—F2-Herbaceous  
 SYN= *Taraxacum erythrospermum* Andr. ex Bess.  
**Taraxacum officinale** L. subsp. *officinale*—F2-Herbaceous  
**Tragopogon dubius** Scop.—F2-Herbaceous  
**Tragopogon porrifolius** L.—F2-Herbaceous  
**Tridax procumbens** L.—F3-Herbaceous  
**Xanthium spinosum** L.—F2-Herbaceous  
 SYN= *Xanthium spinosum* var. *inerme* Bel.  
**Youngia japonica** (L.) DC.—F2-Herbaceous  
**Zinnia violacea** Cav.—F3-Herbaceous  
**BASELLACEAE**  
**Anredera cordifolia** (Ten.) Steenis—F3-Herbaceous  
 SYN= *Boussingaultia gracilis* Miers  
**BERBERIDACEAE**  
**Nandina domestica** Thunb.—F1-Woody  
**BIGNONIACEAE**  
**Macfadyena unguis-cati** (L.) A.H. Gentry—F3-Woody WATCH  
**Paulownia tomentosa** (Thunb.) Sieb. & Zucc. ex Steud.—F3-Woody  
**BORAGINACEAE**  
**Anchusa azurea** P. Mill.—F3-Herbaceous  
 SYN= *Anchusa italica* Retz.  
**Buglossoides arvensis** (L.) I.M. Johnston—F2-Herbaceous  
 SYN= *Lithospermum arvense* L.  
**Cynoglossum zeylanicum** (Vahl) Thunb. ex Lehm.—F3-Herbaceous  
**Echium vulgare** L.—F3-Herbaceous  
**Heliotropium amplexicaule** Vahl—F2-Herbaceous  
**Heliotropium europaeum** L.—F3-Herbaceous  
**Heliotropium indicum** L.—F2-Herbaceous  
**Lappula squarrosa** (Retz.) Dumort.—F4-Herbaceous  
**BRASSICACEAE** Mustard Family  
**Arabidopsis thaliana** (L.) Heynh.—F2-Herbaceous  
**Brassica juncea** (L.) Czern.—F3-Herbaceous  
**Brassica nigra** (L.) W.D.J. Koch—F3-Herbaceous  
**Brassica oleracea** L.—F3-Herbaceous  
**Brassica rapa** L.—F2-Herbaceous  
 SYN= *Brassica campestris* var. *rapa* (L.) Hartman



- SYN= *Brassica rapa* var. *campestris* (L.) W.D.J. Koch  
***Brassica tournefortii*** Gouan—F3-Herbaceous  
***Cakile maritima*** Scop.—F4-Herbaceous  
***Camelina microcarpa*** DC.—F2-Herbaceous  
 SYN= *Camelina sativa* subsp. *microcarpa* (DC.) E. Schmid  
***Camelina rumelica*** Velen.—F3-Herbaceous  
***Capsella bursa-pastoris*** (L.) Medik.—F2-Herbaceous  
***Cardamine debilis*** D. Don—F2-Herbaceous  
***Cardamine hirsuta*** L.—F2-Herbaceous  
***Cardaria draba*** (L.) Desv.—F3-Herbaceous  
***Chorispura tenella*** (Pallas) DC.—F2-Herbaceous  
***Conringia orientalis*** (L.) Dumort.—F2-Herbaceous  
***Coronopus didymus*** (L.) Sm.—F2-Herbaceous  
***Descurainia sophia*** (L.) Webb ex Prantl—F2-Herbaceous  
***Diplotaxis muralis*** (L.) DC.—F2-Herbaceous  
***Diplotaxis tenuifolia*** (L.) DC.—F3-Herbaceous  
***Eruca vesicaria*** subsp. *sativa* (P. Mill.) Thellung—F2-Herbaceous  
 SYN= *Brassica eruca* L.  
 SYN= *Eruca sativa* P. Mill.  
 SYN= *Raphanus eruca* (L.) Crantz  
***Erucastrum gallicum*** (Willd.) O.E. Schulz—F2-Herbaceous  
***Erysimum repandum*** L.—F2-Herbaceous  
***Lepidium campestre*** (L.) R. Br.—F3-Herbaceous  
***Lepidium latifolium*** L.—F3-Herbaceous  
***Lepidium ruderales*** L.—F3-Herbaceous  
***Lobularia maritima*** (L.) Desv.—F3-Herbaceous  
 SYN= *Alyssum maritimum* (L.) Lam.  
***Matthiola incana*** (L.) Ait. f.—F3-Herbaceous  
***Matthiola longipetala*** (Vent.) DC.—F3-Herbaceous  
 SYN= *Matthiola longipetala* subsp. *bicornis* (Sibthorp & Sm.) P.W. Ball  
***Myagrimum perfoliatum*** L.—F3-Herbaceous  
***Nasturtium officinale*** W.T. Ait.—F1-Woody  
 SYN= *Rorippa nasturtium-aquaticum* (L.) Hayek  
***Raphanus rapistrum*** L.—F3-Herbaceous  
***Raphanus sativus*** L.—F3-Herbaceous  
 SYN= *Raphanus raphanistrum* var. *sativus* (L.) G. Beck  
***Rapistrum rugosum*** (L.) All.—F1-Herbaceous  
***Sinapis alba*** L.—F4-Herbaceous  
***Sinapis arvensis*** L.—F2-Herbaceous  
 SYN= *Brassica kaber* (DC.) L.C. Wheeler  
***Sisymbrium altissimum*** L.—F2-Herbaceous  
***Sisymbrium irio*** L.—F2-Herbaceous  
***Sisymbrium officinale*** (L.) Scop.—F2-Herbaceous  
***Sisymbrium orientale*** L.—F3-Herbaceous  
 SYN= *Brassica kaber* var. *orientalis* (L.) Scoggan  
***Sisymbrium polyceratium*** L.—F3-Herbaceous  
***Thlaspi arvense*** L.—F2-Herbaceous
- CACTACEAE**  
***Opuntia ficus-indica*** (L.) P. Mill.—F3-Woody  
 SYN= *Opuntia compressa* J.F. Macbr.  
***Pereskia aculeata*** P. Mill.—F3-Woody
- CAMPANULACEAE**  
***Campanula rapunculoides*** L.—F3-Herbaceous  
***Wahlenbergia marginata*** (Thunb.) A. DC.—F3-Herbaceous

**CANNABACEAE**

***Cannabis sativa*** L. var. *sativa*—F3-Woody

**CANNACEAE**

***Canna xgeneralis*** Bailey [glauca x indica]—F3-Herbaceous

SYN= *Canna xorchiodes* Bailey

***Canna indica*** L.—F3-Herbaceous

SYN= *Canna coccinea* P. Mill.

**CAPPARACEAE**

***Cleome gynandra*** L.—F3-Herbaceous

SYN= *Cleome pentaphylla* L.

***Cleome hassleriana*** Chod.—F4-Herbaceous

SYN= *Cleome pungens* auct. non Willd.

SYN= *Cleome spinosa* auct. non Jacq.

**CAPRIFOLIACEAE**

***Lonicera fragrantissima*** Lind. & Paxton—F3-Woody

***Lonicera japonica*** Thunb.—F1-Woody

***Lonicera maackii*** (Rupr.) Herder—F3-Woody WATCH

**CARYOPHYLLACEAE**

***Agrostemma githago*** L.—F3-Herbaceous

***Arenaria serpyllifolia*** L.—F2-Herbaceous

***Cerastium fontanum*** Baumg.—F2-Herbaceous

SYN= *Cerastium holosteoides* auct. non Fries

SYN= *Cerastium holosteoides* var. *vulgare* (Hartman) Hyl.

***Cerastium glomeratum*** Thuill.—F2-Herbaceous

SYN= *Cerastium viscosum* auct. non L.

***Cerastium pumilum*** W. Curtis—F2-Herbaceous

***Dianthus armeria*** L.—F3-Herbaceous—

***Dianthus barbatus*** L.—F4-Herbaceous

***Gypsophila elegans*** M. Bieb.—F3-Herbaceous

***Holosteum umbellatum*** L.—F2-Herbaceous

***Petrorhagia dubia*** (Raf.) López & Romo—F2-Herbaceous

SYN= *Petrorhagia velutina* (Guss.) P.W. Ball & Heywood

***Polycarpon tetraphyllum*** (L.) L.—F2-Herbaceous

***Sagina procumbens*** L.—F4-Herbaceous

***Saponaria officinalis*** L.—F3-Herbaceous

***Silene conoidea*** L.—F3-Herbaceous

***Silene dichotoma*** Ehrh.—F4-Herbaceous

***Silene gallica*** L.—F2-Herbaceous

***Spergula arvensis*** L.—F3-Herbaceous

***Spergularia echinosperma*** (Celak.) Aschers. & Graebn.—F3-Herbaceous—

***Spergularia platensis*** (Camb.) Fenzl—F3-Herbaceous

***Stellaria media*** (L.) Vill.—F2-Herbaceous

***Stellaria pallida*** (Dumort.) Crépin—F2-Herbaceous

SYN= *Stellaria media* subsp. *pallida* (Dumort.) Aschers. & Graebn.

***Stellaria parva*** Pedersen—F3-Herbaceous

***Vaccaria hispanica*** (P. Mill.) Rauschert—F2-Herbaceous

***Vaccaria pyramidata*** Medic.—F2-Herbaceous

**CASUARINACEAE**

***Casuarina equisetifolia*** L.—F3-Woody WATCH

**CELASTRACEAE**

***Euonymus fortunei*** (Turcz.) Hand.-Mazz.—F3-Herbaceous

**CHENOPODIACEAE**

***Atriplex holocarpa*** F. Muell.—F3-Woody



**Atriplex rosea** L.—F3-Herbaceous  
**Atriplex semibaccata** R. Br.—F1-Herbaceous  
**Bassia hyssopifolia** (Pallas) Kuntz—F3-Herbaceous  
 SYN= *Kochia hyssopifolia* (Pallas) Schrad.  
**Bassia scoparia** (L.) A.J. Scott—F1-Herbaceous  
 SYN= *Kochia scoparia* (L.) Schrad.  
**Beta vulgaris** L.—F3-Herbaceous  
 SYN= *Beta vulgaris* subsp. *maritima* (L.) Arcang.  
**Chenopodium album** L.—F2-Herbaceous  
**Chenopodium ambrosioides** L.—F2-Herbaceous  
**Chenopodium botrys** L.—F3-Herbaceous  
**Chenopodium glaucum** L.—F3-Herbaceous  
**Chenopodium murale** L.—F2-Herbaceous  
**Chenopodium opulifolium** Schrad. ex Koch & Ziz—F4-Herbaceous  
 SYN= *Chenopodium album* var. *viride* (L.) Moq.  
 SYN= *Chenopodium viride* L.  
**Chenopodium pumilio** R. Br.—F3-Herbaceous  
 SYN= *Chenopodium carinatum* auct. non R. Br.  
**Chenopodium vulvaria** L.—F4-Herbaceous  
**Salsola collina** Pallas—F4-Herbaceous  
**Salsola kali** L. subsp. **pontica** (Pallas) Mosyakin—F1-Herbaceous  
 SYN= *Salsola kali* var. *pontica* Pallas  
 SYN= *Salsola pontica* (Pallas) A. Degen  
**Salsola tragus** L.—F1-Herbaceous  
 SYN= *Salsola iberica* (Sennen & Pau) Botsch. ex Czerepanov  
 SYN= *Salsola kali* subsp. *tragus* (L.) Celak.  
 SYN= *Salsola pestifer* A. Nels.  
**Spinacia oleracea** L.—F3-Herbaceous

**CLUSIACEAE**  
**Hypericum perforatum** L.—F2-Woody WATCH

**COMBRETACEAE**  
**Conocarpus erectus** L.—F3-Woody  
**Laguncularia racemosa** (L.) Gaertn.—F3-Woody

**COMMELINACEAE**  
**Commelina communis** L.—F2-Herbaceous  
**Gibasis pellucida** (Mart. & Gal.) D.R. Hunt—F2-Herbaceous  
**Murdannia nudiflora** (L.) Brenan—F2-Herbaceous  
 SYN= *Aneilema nudicaule* (Burm. f.) G. Don  
 SYN= *Aneilema nudiflorum* (L.) Sweet

**CONVOLVULACEAE**  
**Convolvulus arvensis** L.—F2-Herbaceous  
**Ipomoea alba** L.—F3-Herbaceous  
**Ipomoea batatas** (L.) Lam.—F4-Herbaceous  
**Ipomoea cairica** (L.) Sweet—F3-Herbaceous  
**Ipomoea capillacea** (Kunth) G. Don—F3-Herbaceous  
**Ipomoea carnea** Jacq.—F2-Herbaceous  
 SYN= *Ipomoea crassicaulis* (Benth.) B.L. Robins.  
 SYN= *Ipomoea fistulosa* Mart. ex Choisy  
**Ipomoea fistulosa** Mart.—F4-Herbaceous  
**Ipomoea hederifolia** L.—F4-Herbaceous  
 SYN= *Ipomoea coccinea* var. *hederifolia* (L.) Gray  
**Ipomoea indica** (Burm. f.) Merr.—F3-Herbaceous  
 SYN= *Ipomoea acuminata* (Vahl) Roemer & J.A. Schultes  
**Ipomoea nil** (L.) Roth—F3-Herbaceous

**Ipomoea quamoclit** L.—F3-Herbaceous  
**Ipomoea setosa** Ker-Gawl.—F4-Herbaceous  
**Ipomoea tricolor** Cav.—F3-Herbaceous  
**Ipomoea turbinata** Lag.—F4-Herbaceous  
 SYN= *Ipomoea muricata* (L.) Jacq.  
**Ipomoea violacea** L.—F4-Herbaceous  
**Ipomoea wrightii** Gray—F4-Herbaceous  
 SYN= *Ipomoea heptaphylla* (Roxb.) Voigt

**CRASSULACEAE**  
**Kalanchoe daigremontana** Raym.-Hamet & Perrier—F3-Herbaceous  
**Kalanchoe delagoensis** Ecklon & Zeyh.—F4-Herbaceous  
 SYN= *Kalanchoe tubiflora* (Harvey) Hamet  
 SYN= *Kalanchoe verticillata* Ell.  
**Kalanchoe fedtschenkoi** Raym.-Hamet & H. Perrier—F4-Herbaceous

**CUCURBITACEAE**  
**Citrullus colocynthis** (L.) Schrad.—F4-Herbaceous  
**Citrullus lanatus** var. **citroides** (Bailey) Mansf.—F4-Herbaceous  
 SYN= *Citrullus vulgaris* var. *citroides* Bailey  
**Citrullus lanatus** (Thunb.) Mansf. var. **lanatus**—F4-Herbaceous  
 SYN= *Citrullus vulgaris* Schrad.  
**Coccinia grandis** (L.) Voigt—F4-Herbaceous  
 SYN= *Coccinia cordifolia* sensu Correll & Johnston  
**Cucumis anguria** L.—F3-Herbaceous  
**Cucumis dipsaceus** C.G. Ehrenb. ex Spach—F3-Herbaceous  
**Cucumis melo** L.—F2-Herbaceous  
**Cucumis melo** var. **dudain** Naud.—F4-Herbaceous  
**Lagenaria siceraria** (Molina) Standl.—F3-Herbaceous  
**Luffa aegyptiaca** P. Mill.—F3-Herbaceous  
 SYN= *Luffa cylindrica* (L.) M. Roemer  
**Momordica balsamina** L.—F4-Herbaceous  
**Momordica charantia** L.—F4-Herbaceous

**CUSCUTACEAE**  
**Cuscuta japonica** Choisy—F3-Herbaceous  
**Cuscuta suaveolens** Ser.—F3-Herbaceous

**CYPERACEAE**  
**Bulbostylis barbata** (Rottb.) C.B. Clarke—F3-Herbaceous  
**Cyperus difformis** L.—F2-Herbaceous  
**Cyperus entrerianus** Bockeler—F1-Herbaceous  
**Cyperus eragrostis** Lam.—F3-Herbaceous  
 SYN= *Cyperus vegetus* Willd.  
**Cyperus involucratus** Rottb.—F2-Herbaceous  
**Cyperus iria** L.—F2-Herbaceous  
**Cyperus phaeolepis** Cherm.—F4-Herbaceous  
**Cyperus prolixus** Kunth—F3-Herbaceous  
**Cyperus rotundus** L.—F2-Herbaceous  
**Rhynchospora debilis** Gale—F3-Herbaceous

**DIOSCOREACEAE**  
**Dioscorea bulbifera** L.—F4-Herbaceous

**DIPSACACEAE**  
**Scabiosa atropurpurea** L.—F2-Herbaceous  
**Dipsacus fullonum** L.—F3-Herbaceous



## DRYOPTERIDACEAE

**Cyrtomium falcatum** (L. f.) K. Presl—F3-Herbaceous  
 SYN= *Polystichum falcatum* (L. f.) Diels

## ELAEAGNACEAE

**Elaeagnus angustifolia** L.—F3-Woody WATCH  
**Elaeagnus commutata** Rydb.—F3-Woody  
**Elaeagnus pungens** Thunb.—F3-Woody

## EUPHORBIACEAE

**Croton argenteus** L.—F2-Herbaceous  
**Chamaesyce hirta** (L.) Millsp.—F3-Herbaceous  
**Euphorbia cyparissias** L.—F4-Herbaceous  
**Euphorbia exigua** L.—F3-Herbaceous  
**Euphorbia helioscopia** L.—F3-Herbaceous  
**Euphorbia lathyris** L.—F3-Herbaceous  
**Manihot esculenta** Crantz—F3-Woody  
**Phyllanthus fraternus** G.L. Webster—F3-Herbaceous  
**Phyllanthus tenellus** Roxb.—F3-Herbaceous  
**Phyllanthus urinaria** L.—F2-Herbaceous  
**Ricinus communis** L.—F2-Herbaceous  
**Triadica sebifera** (L.) Small—F1-Woody  
 SYN= *Sapium sebiferum* (L.) Roxb.

## FABACEAE

**Aeschynomene evenia** C. Wright—F3-Herbaceous  
**Albizia julibrissin** Durazz.—F2-Woody  
**Albizia lebeck** (L.) Benth.—F3-Woody  
**Alhagi maurorum** Medik.—F3-Herbaceous  
 SYN= *Alhagi camelorum* Fisch.  
**Alysicarpus vaginalis** (L.) DC.—F3-Herbaceous  
**Arachis hypogaea** L.—F3-Herbaceous  
**Caesalpinia gilliesii** (Hook.) Wallich ex D. Dietr.—F3-Woody  
 SYN= *Poinciana gilliesii* Wallich ex Hook.  
**Caesalpinia mexicana** Gray—F3-Woody  
 SYN= *Poinciana mexicana* (Gray) Britt. & Rose  
**Caesalpinia pulcherrima** (L.) Sw.—F3-Woody  
 SYN= *Poinciana pulcherrima* L.  
**Clitoria ternatea** L.—F3-Herbaceous  
**Coronilla varia** L.—F2-Herbaceous  
**Crotalaria retusa** L.—F3-Herbaceous  
**Crotalaria spectabilis** Roth—F3-Herbaceous  
 SYN= *Crotalaria retzii* A.S. Hitchc.  
**Kummerowia stipulacea** (Maxim.) Makino—F3-Herbaceous  
 SYN= *Lespedeza stipulacea* Maxim.  
**Kummerowia striata** (Thunb.) Schindl.—F2-Herbaceous  
 SYN= *Lespedeza striata* (Thunb.) Hook. & Arn.  
**Lathyrus aphaca** L.—F3-Herbaceous  
**Lathyrus hirsutus** L.—F2-Herbaceous  
**Lathyrus latifolius** L.—F3-Herbaceous  
**Lespedeza bicolor** Turcz.—F3-Herbaceous  
**Lespedeza cuneata** (Dum.-Cours.) G. Don—F2-Herbaceous WATCH  
**Leucaena leucocephala** (Lam.) de Wit—F3-Woody WATCH  
**Lotus corniculatus** L.—F3-Herbaceous  
**Macroptilium gibbosifolium** (Ortega) A. Delgado—F4-Herbaceous  
**Medicago arabica** (L.) Huds.—F2-Herbaceous

**Medicago lupulina** L.—F2-Herbaceous  
**Medicago minima** (L.) L.—F2-Herbaceous  
**Medicago orbicularis** (L.) Bartalini—F2-Herbaceous  
**Medicago polymorpha** L.—F2-Herbaceous  
**Medicago sativa** L.—F2-Herbaceous  
 SYN= *Medicago xvaria* Martyn  
**Melilotus albus** Medik.—F1-Herbaceous  
**Melilotus indicus** (L.) All.—F1-Herbaceous  
**Melilotus officinalis** (L.) Lam.—F1-Herbaceous  
**Neptunia plena** (L.) Benth.—F3-Herbaceous  
**Oxyrhynchus volubilis** Brandeg.—F4-Herbaceous  
**Prosopis laevigata** (Humb. & Bonpl. ex Will.—Id.) M.C. Johnston—F3-Woody  
**Pueraria montana** var. **lobata** (Willd.) Maesen & Almeida—F2-Woody WATCH  
 SYN= *Pueraria lobata* (Willd.) Ohwi  
**Senna corymbosa** (Lam.) Irwin & Barneby—F3-Woody  
 SYN= *Cassia corymbosa* Lam.  
**Senna occidentalis** (L.) Link—F2-Herbaceous  
 SYN= *Cassia occidentalis* L.  
**Sesbania emerus** (Aubl.) Urb.—F2-Herbaceous  
**Sesbania punicea** (Cav.) Benth.—F3-Herbaceous  
**Sesbania sericea** (Willd.) Link—F3-Herbaceous  
**Spartium junceum** L.—F3-Woody  
**Sphaerophysa salsula** (Pallas) DC.—F3-Herbaceous  
**Trifolium arvense** L.—F3-Herbaceous  
**Trifolium campestre** Schreb.—F3-Herbaceous  
**Trifolium dubium** Sibthorp—F2-Herbaceous  
**Trifolium incarnatum** L.—F2-Herbaceous  
**Trifolium lappaceum** L.—F3-Herbaceous  
**Trifolium polymorphum** Poir.—F2-Herbaceous  
 SYN= *Trifolium amphianthum* Torr. & Gray  
**Trifolium pratense** L.—F3-Herbaceous  
**Trifolium repens** L.—F2-Herbaceous  
**Trifolium resupinatum** L.—F2-Herbaceous  
**Trifolium subterraneum** L.—F3-Herbaceous  
**Trifolium vesiculosum** Savi—F2-Herbaceous  
**Vicia grandiflora** Scop.—F3-Herbaceous  
**Vicia hirsuta** (L.) S.F. Gray—F3-Herbaceous  
**Vicia lathyroides** L.—F3-Herbaceous  
**Vicia lutea** L.—F3-Herbaceous  
**Vicia sativa** subsp. **nigra** (L.) Ehrh.—F2-Herbaceous  
 SYN= *Vicia angustifolia* L.  
 SYN= *Vicia sativa* var. *angustifolia* (L.) Ser.  
 SYN= *Vicia sativa* var. *nigra* L.  
 SYN= *Vicia sativa* var. *segetalis* (Thuill.) Ser.  
**Vicia sativa** L. subsp. **sativa**—F3-Herbaceous  
 SYN= *Vicia sativa* var. *linearis* Lange  
**Vicia tetrasperma** (L.) Schreb.—F2-Herbaceous  
**Vicia villosa** Radzhi subsp. **varia** (Host) Corb.—F3-Herbaceous  
 SYN= *Vicia dasycarpa* Ten.  
**Vicia villosa** Radzhi subsp. **villosa**—F2-Herbaceous  
**Vigna unguiculata** (L.) Walp.—F3-Herbaceous  
 SYN= *Vigna sinensis* (L.) Savi  
**Wisteria sinensis** (Sims) DC.—F1-Woody

## FUMARIACEAE

**Fumaria densiflora** DC.—F3-Herbaceous



*Fumaria officinalis* L.—F3-Herbaceous

*Fumaria parviflora* Lam.—F4-Herbaceous

#### GENTIANACEAE

*Centaurium pulchellum* (Sw.) Druce—F2-Herbaceous

*Centaurium muhlenbergii* (Griseb.) Piper—F2-Herbaceous

#### GERANIACEAE

*Erodium botrys* (Cav.) Bertol.—F3-Herbaceous

*Erodium malacoides* (L.) Willd.—F3-Herbaceous

*Erodium cicutarium* (L.) L'Hér. ext Ait.—F2-Herbaceous

*Geranium dissectum* L.—F2-Herbaceous

#### GOODENIACEAE

*Scaveola plumieri* (L.) Vahl—F3-Herbaceous

#### HALORAGACEAE

*Myriophyllum aquaticum* (Vell.) Verdc.—F1-Woody

syn= *Myriophyllum brasiliense* Camb.

syn= *Myriophyllum proserpinacoides* Gillies ex Hook. & Arn.

*Myriophyllum spicatum* L.—F1-Woody

#### HYDROCHARITACEAE

*Egeria densa* Planch.—F2-Woody

syn= *Elodea densa* (Planch.) Caspary

*Hydrilla verticillata* (L. f.) Royle—F1-Woody

*Ottelia alismoides* (L.) Pers.—F2-Woody

#### IRIDACEAE

*Belamcanda chinensis* (L.) DC.—F3-Herbaceous

*Crocasmia xrocosmiiflora* (V. Lemoine) N.E. Br.—F4-Herbaceous

*Iris pallida* Lam.—F4-Herbaceous

*Iris pseudacorus* L.—F3-Herbaceous

*Romulea rosea* (L.) Eckl.—F3-Herbaceous

*Tritonia crocosmifolia* Lem.—F3-Herbaceous

#### JUNCACEAE

*Juncus capitatus* Weigel—F2-Herbaceous

#### LAMIACEAE

*Ajuga reptans* L.—F3-Herbaceous

*Glechoma hederacea* L.—F4-Herbaceous

*Hyptis mutabilis* (Rich.) Briq.—F3-Herbaceous

*Lamium amplexicaule* L.—F2-Herbaceous

*Lamium purpureum* L.—F2-Herbaceous

*Leonotis nepetifolia* (L.) Ait. f.—F2-Herbaceous

*Leonurus cardiaca* L.—F3-Herbaceous

*Leonurus sibiricus* L.—F3-Herbaceous

*Marrubium vulgare* L.—F1-Herbaceous

*Mentha arvensis* L.—F3-Herbaceous

*Mentha xpiperita* L.—F3-Herbaceous

*Mentha xrotundifolia* (L.) Huds.—F3-Herbaceous

*Mentha spicata* L.—F3-Herbaceous

*Mentha suaveolens* Ehrh.—F3-Herbaceous

*Moluccella laevis* L.—F3-Herbaceous

*Nepeta cataria* L.—F3-Herbaceous

*Perilla frutescens* (L.) Britton—F2-Herbaceous WATCH

*Prunella vulgaris* L.—F2-Herbaceous

*Rosmarinus officinalis* L.—F3-Woody

*Salvia hispanica* L.—F4-Herbaceous

*Salvia tiliifolia* Vahl—F3-Herbaceous

*Scutellaria minor* Hudson—F3-Herbaceous

*Scutellaria racemosa* Pers.—F3-Herbaceous

*Sideritis lanata* L.—F3-Herbaceous

*Stachys floridana* Shuttlew. ex Benth.—F2-Herbaceous WATCH

#### LAURACEAE

*Cinnamomum camphora* (L.) J. Presl—F3-Woody WATCH

#### LEMNACEAE

*Landoltia punctata* (G. Mey.) Les & Crawford—F2-Woody

syn= *Spirodela punctata* (G. Mey.) C.H. Thompson

#### LILIACEAE

*Allium ampeloprasum* L.—F3-Herbaceous

*Allium porrum* L.—F3-Herbaceous

*Alstroemeria pulchella* L.f.—F3-Herbaceous

*Asparagus officinalis* L.—F3-Herbaceous

*Asphodelus fistulosus* L.—F3-Herbaceous

*Crinum bulbispermum* (Burm.f.) Milne-R. & Schweick.—F3-Herbaceous

syn= *Crinum longifolium* (L.) Thunb.

*Hemerocallis fulva* (L.) L.—F3-Herbaceous

*Hemerocallis lilioasphodelus* L.—F3-Herbaceous

syn= *Hemerocallis flava* (L.) L.

*Hyacinthus orientalis* L.—F3-Herbaceous

*Lilium longiflorum* Thunb.—F3-Herbaceous

*Muscari comosum* (L.) Mill.—F3-Herbaceous

*Muscari neglectum* Guss. ex Ten.—F3-Herbaceous

syn= *Muscari racemosum* (L.) Lam. & DC.

*Ornithogalum umbellatum* L.—F4-Herbaceous

*Tristagma uniflorum* (Lindl.) Traub—F3-Herbaceous

syn= *Ipheion uniflorum* (Lindl.) Raf.

*Zephyranthes candida* (Lindl.) -Herbaceousert—F3-Herbaceous

syn= *Atamosco candida* (Lindl.) Small

*Zephyranthes grandiflora* Lindl.—F3-Herbaceous

#### LIMNOCHARITACEAE

*Hydrocleys nymphoides* (H. & B. ex Willd.) Buch.—F2-Woody

#### LINACEAE

*Linum grandiflorum* Desf.—F3-Herbaceous

*Linum usitatissimum* L.—F3-Herbaceous

#### LOGANIACEAE

*Buddleja lindleyana* Fort.—F3-Woody

#### LYGODIACEAE

*Lygodium japonicum* (Thunb. ex Murr.) Sw.—F1-Herbaceous

#### LYTHRACEAE

*Cuphea carthagenensis* (Jacq.) J.F. Macbr.—F2-Herbaceous

*Cuphea glutinosa* Cham. & Schlecht.—F3-Herbaceous

*Cuphea viscosissima* Jacq.—F3-Herbaceous

*Lagerstroemia indica* L.—F2-Woody

*Lythrum salicaria* L.—F3-Herbaceous

#### MAGNOLIACEAE

*Liriodendron tulipifera* L.—F3-Woody



**MALVACEAE**

- Abutilon theophrasti** Medik.—F3-Herbaceous  
**Alcea rosea** L.—F3-Herbaceous  
syn= Althaea rosea (L.) Cav.  
**Hibiscus esculentus** L.—F3-Herbaceous  
**Hibiscus syriacus** L.—F3-Woody  
**Hibiscus trionum** L.—F3-Herbaceous  
**Krapovickasia physaloides** (Presl) Fryxell—F3-Herbaceous  
**Lavatera trimestris** L.—W2  
**Malva neglecta** Wallr.—F2-Herbaceous  
**Malva parviflora** L.—F2-Herbaceous  
**Malva rotundifolia** L.—F3-Herbaceous  
syn?= Malva pusilla Sm.  
**Malva sylvestris** L.—F3-Herbaceous  
**Malvastrum coromandelianum** (L.) Garcke—F2-Herbaceous  
**Malvaviscus penduliflorus** DC.—F4-Herbaceous  
syn= Malvaviscus aboreus var. penduliflorus (DC.) Schery  
**Pavonia hastata** Cav.—F3-Herbaceous

**MELIACEAE**

- Melia azedarach** L.—F1-Woody

**MENYANTHACEAE**

- Nymphoides indica** (L.) Kuntze—F2-Woody  
**Nymphoides peltata** (Gmel.) Kuntze—F2-Woody

**MOLLUGINACEAE**

- Glinus lotoides** L.—F3-Herbaceous  
**Mollugo cerviana** (L.) Ser.—F2-Herbaceous

**MORACEAE**

- Broussonetia papyrifera** (L.) L'Hér. ex Vent.—F2-Woody  
**Fatoua villosa** (Thunb.) Nakai—F2-Herbaceous  
**Ficus carica** L.—F3-Woody  
**Ficus pumila** L.—F3-Woody  
**Morus alba** L.—F2-Woody

**MYRSINACEAE**

- Ardisia crenata** Sims—F3-Woody WATCH

**MYRTACEAE**

- Myrtus communis** L.—F3-Woody

**NYCTAGINACEAE**

- Bougainvillea glabra** Choisy—F3-Herbaceous  
**Mirabilis jalapa** L.—F3-Herbaceous

**OLEACEAE**

- Jasminum mesnyi** Hance—F3-Woody  
**Ligustrum japonicum** Thunb.—F3-Woody  
**Ligustrum lucidum** Ait. f.—F1-Woody  
**Ligustrum quihoui** Carr.—F1-Woody  
**Ligustrum sinense** Lour.—F1-Woody

**ONAGRACEAE**

- Ludwigia erecta** (L.) H. Hara—F3-Herbaceous  
**Ludwigia grandiflora** (M. Micheli) Greuter & Burdet subsp.  
**grandiflora**—F2-Woody  
syn= Ludwigia uruguayensis (Camb.) Hara  
**Ludwigia grandiflora**  
 subsp. *hexapetala* (Hook. & Arn.) Nesom & Kartesz—F2-Woody

syn= Ludwigia hexapetala (Hook. & Arn.) Zardini et al.

- Oenothera cordata** J.W. Loudon—F2-Herbaceous

**ORCHIDACEAE**

- Zeuxine strateumatica** (L.) Schlechter—F3-Herbaceous

**OROBANCHACEAE**

- Orobanche minor** Sm.—F3-Herbaceous  
**Orobanche ramosa** L.—F1-Herbaceous

**OXALIDACEAE**

- Oxalis corniculata** L.—F3-Herbaceous  
**Oxalis debilis** Kunth—F2-Herbaceous  
syn= Oxalis corymbosa DC.  
**Oxalis articulata** Savigny—F2-Herbaceous  
syn= Oxalis rubra St. Hil.

**PAPAVERACEAE**

- Eschscholzia californica** Cham.—F3-Herbaceous  
**Glaucium corniculatum** (L.) J.H. Rudolph—F3-Herbaceous  
**Papaver rhoeas** L.—F3-Herbaceous  
**Papaver somniferum** L.—F3-Herbaceous

**PARKERIACEAE**

- Ceratopteris thalictroides** (L.) Brongn.—F2-Woody

**PEDALIACEAE**

- Sesamum orientale** L.—F4-Herbaceous  
syn= Sesamum indicum L.

**PINACEAE**

- Pinus elliotii** Engelm.—F3-Woody

**PIPERACEAE**

- Peperomia pellucida** (L.) Kunth—F3-Herbaceous

**PLANTAGINACEAE**

- Plantago coronopus** L.—F3-Herbaceous  
**Plantago lanceolata** L.—F2-Herbaceous  
**Plantago major** L.—F2-Herbaceous

**POACEAE** Grass Family

- Achnatherum clandestinum** (Hack.) Barkworth—F3-Herbaceous

syn= Stipa clandestina Hack.

- Aegilops cylindrica** Host—F2-Herbaceous

syn= Triticum cylindricum (Host) Ces., Pass., & Gib.

- Agropyron cristatum** (L.) Gaertn.—F3-Herbaceous

syn= Agropyron subsp. pectinatum (Bieb.) Tzvelev

syn= Agropyron cristatiforme Sarkar

syn= Agropyron pectiniforme Roemer & Schultes

syn= Agropyron desertorum (Fisch. ex Link) J.A. Schultes

- Agrostis avenacea** J.F. Gmel.—F3-Herbaceous

- Agrostis stolonifera** L.—F3-Herbaceous

syn= Agrostis alba auct. non L.

syn= Agrostis gigantea Roth

syn= Agrostis stolonifera subsp. gigantea (Roth) Schuebl. & Martens

- Aira caryophyllea** L.—F2-Herbaceous

syn= Aira elegans Willd. ex Kunth

syn= Aira capillaris Host

syn= Aira caryophyllea var. capillaris (Host) Mutel

- Alopecurus geniculatus** L.—F4-Herbaceous

- Alopecurus myosuroides** Huds.—F3-Herbaceous



- SYN= *Alopecurus agrestis* L.  
**Anthoxanthum aristatum** Boiss.—F3-Herbaceous  
 SYN= *Anthoxanthum odoratum* var. *puelii* (Lecoq & Lamotte) Coss. & Durieu  
**Anthoxanthum odoratum** L.—F2-Herbaceous  
**Arthraxon hispidus** (Thunb.) Makino—F3-Herbaceous  
 SYN= *Arthraxon hispidus* var. *cryptatherus* (Hack.) Honda  
**Arundo donax** L.—F1-Woody  
**Avena fatua** L.—F2-Herbaceous  
**Avena sativa** L.—F3-Herbaceous  
**Bothriochloa bladhii** (Retz.) S.T. Blake—F3-Herbaceous  
 SYN= *Andropogon caucasicus* Trin.  
 SYN= *Bothriochloa caucasica* (Trin.) C.E. Hubbard  
**Bothriochloa ischaemum** var. **songarica** (Rupr. ex F. & M.) Celarier & Harlan—F1-Herbaceous  
 SYN= *Andropogon ischaemum* var. *songaricus* Rupr. ex Fisch. & Mey.  
**Bothriochloa pertusa** (L.) A. Camus—F3-Herbaceous  
**Brachiaria eruciformis** (Sm.) Griseb.—F3-Herbaceous  
**Brachypodium distachyon** (L.) Beauv.—F3-Herbaceous  
**Briza maxima** L.—F3-Herbaceous  
**Briza minor** L.—F2-Herbaceous  
**Bromus arvensis** L.—F2-Herbaceous  
 SYN= *Bromus japonicus* Thunb. ex Murr.—  
**Bromus catharticus** Vahl—F2-Herbaceous  
 SYN= *Bromus unioloides* Kunth  
 SYN= *Bromus willdenowii* Kunth  
**Bromus commutatus** Schrad.—F3-Herbaceous  
**Bromus diandrus** Roth—F3-Herbaceous  
 SYN= *Bromus rigidus* Roth  
**Bromus hordeaceus** L.—F2-Herbaceous  
 SYN= *Bromus hordeaceus* L. subsp. *molliformis* (Lloyd) Maire & Weiller.  
 SYN= *Bromus hordeaceus* subsp. *divaricatus* (Bonnier & Layens) Kerg.  
**Bromus inermis** Leyss.—F3-Herbaceous  
 SYN= *Bromopsis inermis* (Leyss.) Holub  
**Bromus japonicus** Thunb. ex Murr.—F2-Herbaceous  
**Bromus lanceolatus** Roth—F3-Herbaceous  
**Bromus rubens** L.—F2-Herbaceous  
**Bromus secalinus** L.—F2-Herbaceous  
**Bromus sterilis** L.—F3-Herbaceous  
**Bromus tectorum** L.—F2-Herbaceous  
**Chloris cantherae** Arechav.—F2-Herbaceous  
**Chloris divaricata** R. Br.—F3-Herbaceous  
 SYN= *Chloris cynodontioides* Balansa  
**Chloris gayana** Kunth—F2-Herbaceous  
**Coix lacryma-jobi** L.—F3-Herbaceous  
**Cortaderia selloana** (J.A. & J.H. Schultes) Aschers. & Graebn.—F3-Woody  
**Cynodon aethiopicus** Clayton & Harlan—F3-Herbaceous  
**Cynodon dactylon** (L.) Pers.—F1-Herbaceous  
**Cynodon magennisii** Hurcombe—F4-Herbaceous  
**Cynodon nlemfuensis** Vanderyst—F3-Herbaceous  
**Cynodon transvaalensis** Burt-Davy—F4-Herbaceous  
**Cynosurus echinatus** L.—F3-Herbaceous  
**Dactylis glomerata** L.—F2-Herbaceous  
**Dactyloctenium aegyptium** (L.) Willd.—F2-Herbaceous  
 SYN= *Cynosurus aegyptius* L.  
**Desmazeria rigida** (L.) Tutin—F2-Herbaceous  
 SYN= *Catapodium rigidum* (L.) Hubbard ex Dony  
**Dichanthium annulatum** (Forsk.) Stapf—F1-Herbaceous  
 SYN= *Andropogon annulatus* Forsk.  
**Dichanthium aristatum** (Poir.) C.E. Hubbard—F1-Herbaceous  
**Dichanthium sericeum** (R. Br.) A. Camus—F1-Herbaceous  
 SYN= *Andropogon sericeus* R. Br.  
**Digitaria ischaemum** (Schreb.) Schreb. ex Muhl.—F2-Herbaceous  
**Digitaria milaniana** (Rendle) Stapf—F4-Herbaceous  
**Digitaria sanguinalis** (L.) Scop.—F2-Herbaceous  
**Digitaria violascens** Link—F2-Herbaceous  
 SYN= *Digitaria ischaemum* var. *violascens* (Link) Radford  
**Echinochloa colona** (L.) Link—F2-Herbaceous  
**Echinochloa crus-galli** (L.) Beauv.—F2-Herbaceous  
 SYN= *Echinochloa frumentacea* Link  
 SYN= *Echinochloa crus-galli* var. *frumentacea* (Link) W. Wight  
**Echinochloa paludigena** Wiegand—F4-Herbaceous  
**Ehrharta calycina** Sm.—F3-Herbaceous  
**Eleusine indica** (L.) Gaertn.—F2-Herbaceous  
**Elymus hispidus** (P. Opiz) Meldris—F2-Herbaceous  
**Elymus ponticus** (Podp.) Meldris—F3-Herbaceous  
**Elymus repens** (L.) Gould—F3-Herbaceous  
 SYN= *Agropyron repens* (L.) Beauv.  
**Eragrostis airoides** Nees—F3-Herbaceous  
**Eragrostis amabilis** (L.) Wight & Arnolt ex Nees—F3-Herbaceous  
 SYN= *Eragrostis tenella* (L.) Beauv. ex Roemer & Schultes  
**Eragrostis barrelieri** Daveau—F2-Herbaceous  
**Eragrostis cilianensis** (All.) Vign. ex Janchen—F2-Herbaceous  
**Eragrostis curvula** (Schrad.) Nees—F2-Herbaceous  
**Eragrostis lehmanniana** Nees—F1-Herbaceous  
**Eragrostis minor** Host—F3-Herbaceous  
**Eragrostis pilosa** var. **perplexa** (Harvey) S. Koch—F3-Herbaceous  
**Eragrostis pilosa** (L.) P. Beauv. var. *pilosa*—F2-Herbaceous  
**Eragrostis superba** Peyr.—F3-Herbaceous  
**Eremochloa ophiuroides** (Munro) Hack.—F3-Herbaceous  
**Eriochloa pseudoacrotricha** (Stapf ex Thellung) Hubbard ex Blake—F3-Herbaceous  
**Eustachys caribaea** (Spreng.) Herter—F3-Herbaceous  
**Eustachys retusa** (Lag.) Kunth—F2-Herbaceous  
**Gastridium phleoides** (Nees & Meyen) C.E. Hubbard—F3-Herbaceous  
**Hainardia cylindrica** (Willd.) Greuter—F3-Herbaceous  
 SYN= *Rottboellia cylindrica* Willd.  
 SYN= *Monerma cylindrica* (Willd.) Coss. & Dur.  
**Hemarthria altissima** (Poir.) Stapf & Hubbard—F3-Herbaceous  
 SYN= *Manisuris altissima* (Poir.) A.S. Hitchc.  
**Heteropogon melanocarpus** (Ell.) Benth.—F3-Herbaceous  
**Holcus lanatus** L.—F3-Herbaceous  
**Hordeum murinum** L. subsp. **glaucum** (Steud.) Tzvelev—F4-Herbaceous  
 SYN= *Hordeum glaucum* Steud.



- Hordeum murinum** subsp. *leporinum* (Link) Arcang.—**F2-Herbaceous**  
 SYN= *Critesion murinum* subsp. *leporinum* (Link) A. Löve  
 SYN= *Hordeum leporinum* Link
- Hordeum vulgare** L.—**F3-Herbaceous**
- Imperata cylindrica** (L.) Beauv.—**F3-Herbaceous WATCH**
- Ixophorus unisetus** (J. Presl) Schltld.—**F3-Herbaceous**
- Lamarckia aurea** (L.) Moench—**F3-Herbaceous**
- Leptochloa chloridiformis** (Hack. ex Stuck.) Parodi—**F3-Herbaceous**
- Lolium arundinaceum** (Schreb.) S.J. Darbyshire—**F2-Herbaceous**  
 SYN= *Festuca arundinacea* Schreb.
- Lolium perenne** L.—**F1-Herbaceous**  
 SYN= *Lolium multiflorum* Lam.  
 SYN= *Lolium perenne* subsp. *multiflorum* (Lam.) Husnot  
 SYN= *Lolium perenne* var. *multiflorum* (Lam.) Parnell  
 SYN= *Lolium perenne* subsp. *italicum* (A. Braun) Husnot
- Lolium pratense** (Huds.) S.J. Darbyshire—**F3-Herbaceous**  
 SYN= *Festuca elatior* L. p.p.  
 SYN= *Festuca pratensis* Huds.
- Lolium rigidum** Gaudin—**F4-Herbaceous**  
 SYN= *Lolium perenne* subsp. *rigidum* (Gaudin) Löve & Löve
- Lolium temulentum** L.—**F2-Herbaceous**  
 SYN= *Lolium temulentum* var. *arvense* (With.) Lilja
- Luziola peruviana** Juss. ex J. F. Gmel.—**F3-Herbaceous**
- Melinis repens** (Willd.) Zizka—**F2-Herbaceous**  
 SYN= *Rhynchelytrum repens* (Willd.) C.E. Hubbard
- Mnesithea granularis** (L.)—**F4-Herbaceous**  
 SYN= *Hackelochloa granularis* (L.) Kuntze
- Microstegium vimineum** (Trin.) A. Camus—**F3-Herbaceous WATCH**
- Oryza sativa** L.—**F2-Herbaceous**
- Panicum antidotale** Retz.—**F2-Herbaceous**
- Panicum bergii** Arech.—**F2-Herbaceous**
- Panicum coloratum** L.—**F2-Herbaceous**
- Panicum miliaceum** L.—**F3-Herbaceous**
- Panicum repens** L.—**F3-Herbaceous**
- Panicum trichoides** Sw.—**F3-Herbaceous**
- Parapholis incurva** (L.) C.E. Hubbard—**F2-Herbaceous**  
 SYN= *Pholiurus incurvus* (L.) Schinz & Thellung
- Paspalum alnum** Chase—**F3-Herbaceous**
- Paspalum convexum** Humb. & Bonpl. ex Flueggé—**F3-Herbaceous**
- Paspalum dilatatum** Poir.—**F2-Herbaceous**
- Paspalum hydrophilum** Henr.—**F4-Herbaceous**
- Paspalum malacophyllum** Trin.—**F3-Herbaceous**
- Paspalum notatum** Alain ex Flugge—**F2-Herbaceous**  
 SYN= *Paspalum notatum* var. *latiflorum* J. Döll  
 SYN= *Paspalum notatum* var. *saurae* Parodi
- Paspalum scrobiculatum** L.—**F4-Herbaceous**
- Paspalum urvillei** Steud.—**F2-Herbaceous**
- Pennisetum ciliare** (L.) Link—**F1-Herbaceous**  
 SYN= *Cenchrus ciliaris* L.
- Pennisetum glaucum** (L.) R. Br.—**F3-Herbaceous**  
 SYN= *Pennisetum americanum* (L.) Leeke  
 SYN= *Setaria glauca* (L.) Beauv.
- Pennisetum nervosum** (Nees) Trin.—**F3-Herbaceous**  
 SYN= *Cenchrus nervosus* (Nees) Kuntze
- Pennisetum purpureum** Schumacher—**F3-Herbaceous**
- Pennisetum villosum** R. Br. ex Fresen.—**F2-Herbaceous**  
 SYN= *Cenchrus longisetus* M.C. Johnston
- Phalaris arundinacea** L.—**F3-Herbaceous**
- Phalaris brachystachys** Link—**F3-Herbaceous**
- Phalaris canariensis** L.—**F3-Herbaceous**
- Phalaris minor** Retz.—**F3-Herbaceous**
- Phleum pratense** L.—**F3-Herbaceous**
- Phyllostachys aurea** Carr. ex A. & C. Rivière—**F2-Woody**
- Poa annua** L.—**F2-Herbaceous**
- Poa bulbosa** L.—**F4-Herbaceous**
- Poa compressa** L.—**F3-Herbaceous**
- Poa trivialis** L.—**F4-Herbaceous**
- Polypogon monspeliensis** (L.) Desf.—**F2-Herbaceous**
- Polypogon viridis** (Gouan) Breistr.—**F2-Herbaceous**
- Psathyrostachys juncea** (Fisch.) Nevski—**F4-Herbaceous**  
 SYN= *Elymus junceus* Fisch.
- Rostraria cristata** (L.) Tzvelev—**F3-Herbaceous**  
 SYN= *Koeleria gerardii* (Vill.) Shinnery  
 SYN= *Koeleria phleoides* (Vill.) Pers.
- Rottboellia cochinchinensis** (Lour.) W.D. Clayton—**F3-Herbaceous**  
 SYN= *Aegilops exaltata* L.  
 SYN= *Manisuris exaltata* (L.) Kuntze  
 SYN= *Rottboellia exaltata* (L.) L. f.
- Saccharum officinarum** L.—**F3-Herbaceous**
- Sacciolepis indica** (L.) Chase—**F3-Herbaceous**
- Schismus barbatus** (Loefl. ex L.) Thellung—**F3-Herbaceous**
- Sclerochloa dura** (L.) Beauv.—**F2-Herbaceous**
- Secale cereale** L.—**F3-Herbaceous**  
 SYN= *Triticum cereale* (L.) Salisb.
- Setaria italica** (L.) Beauv.—**F2-Herbaceous**
- Setaria pumila** (Poir.) Roem. & Schult.—**F2-Herbaceous**
- Setaria verticillata** (L.) Beauv.—**F2-Herbaceous**
- Setaria viridis** (L.) P. Beauv.—**F2-Herbaceous**  
 SYN= *Setaria viridis* var. *major* (Gaudin) Pospichal
- Sorghum alnum** Parodi—**F4-Herbaceous**
- Sorghum bicolor** (L.) Moench—**F2-Herbaceous**  
 SYN= *Sorghum saccharatum* (L.) Moench
- Sorghum halepense** (L.) Pers.—**F1-Herbaceous**
- Stenotaphrum secundatum** (Walter) Kuntze—**F3-Herbaceous**
- Themeda triandra** Forssk.—**F3-Herbaceous**
- Thinopyrum intermedium** (Host) Barkworth & Dewey—**F4-Herbaceous**  
 SYN= *Agropyron intermedium* (Host) Beauv.  
 SYN= *Elytrigia intermedia* (Host) Nevski  
 SYN= *Thinopyrum intermedium* subsp. *barbulatum* (Schur) Barkworth & Dewey
- Thinopyrum ponticum** (Podp.) Liu & Wang—**F4-Herbaceous**  
 SYN= *Agropyron elongatum* (Host) Beauv.  
 SYN= *Elymus elongatus* (Host) Runemark  
 SYN= *Elytrigia elongata* (Host) Nevski  
 SYN= *Elytrigia pontica* (Podp.) Holub
- Thinopyrum pycnanthum** (Godr.) Barkworth—**F4-Herbaceous**



- SYN= *Agropyron pycnanthum* (Godr.) Godr. & Gren.  
 SYN= *Elymus pungens* auct. non (Pers.) Melderis  
 SYN= *Elymus pycnanthus* (Godr.) Melderis  
 SYN= *Elytrigia pycnanthes* (Godr.) A. Löve  
**Triraphis mollis** R. Br.—F3-Herbaceous  
**Triticum aestivum** L.—F3-Herbaceous  
**Urochloa brizantha** (Hochstetter ex A. Rich.) R. Webster—F3-Woody  
 SYN= *Brachiaria brizantha* (Hochstetter ex A. Rich.) Stapf  
**Urochloa maxima** (Jacq.) R. Webster—F1-Herbaceous  
**Urochloa mosambicensis** (Hack.) Dandy—F3-Woody  
**Urochloa mutica** (Forsk.) T.Q. Nguyen—F3-Herbaceous  
 SYN= *Brachiaria mutica* (Forsk.) Stapf  
 SYN= *Panicum muticum* Forsk.  
**Urochloa panicoides** Beauv.—F3-Herbaceous  
**Urochloa plantaginea** (Link) R. Webster—F3-Herbaceous  
 SYN= *Brachiaria plantaginea* (Link) A.S. Hitchc.  
**Urochloa ramosa** (L.) Nguyen—F3-Herbaceous  
 SYN= *Brachiaria ramosa* (L.) Stapf  
**Urochloa reptans** (L.) Stapf.—F2-Herbaceous  
 SYN= *Panicum reptans* L.  
 SYN= *Brachiaria reptans* (L.) Gard. & Hubb.  
**Vulpia bromoides** (L.) S.F. Gray—F3-Herbaceous  
 SYN= *Festuca bromoides* L.  
 SYN= *Vulpia dertonensis* (All.) Gola  
**Vulpia myuros** (L.) K.C. Gmel.—F2-Herbaceous  
 SYN= *Festuca myuros* L.  
 SYN= *Vulpia myuros* var. *hirsuta* Hack.  
**Zea mays** L.—F3-Herbaceous  
**Zea perennis** (Hitchc.) Reeves & Manglesdorf—F3-Herbaceous  
 SYN= *Euchlaena perennis* Hitchc.
- POLYGONACEAE**  
**Antigonon leptopus** Hook. & Arn.—F3-Herbaceous  
**Emex spinosa** (L.) Campd.—F3-Herbaceous  
 SYN= *Rumex spinosus* L.  
**Fagopyrum esculentum** Moench—F3-Herbaceous  
**Polygonum arenastrum** Jord. ex Boreau—F2-Herbaceous  
**WATCH**  
 SYN= *Polygonum aviculare* var. *arenastrum* (Jord. ex Boreau) Rouy  
**Polygonum argyrocoleon** Steud. ex Kunze—F3-Herbaceous  
**Polygonum aviculare** L.—F2-Herbaceous  
**Polygonum caespitosum** Blume—F3-Herbaceous  
**Polygonum caespitosum** var. *longisetum* (Bruijn) A.N. Steward—F3-Herbaceous  
**Polygonum convolvulus** L.—F2-Herbaceous  
**Polygonum hydropiper** L.—F3-Herbaceous  
 SYN= *Persicaria hydropiper* (L.) Opiz  
**Polygonum orientale** L.—F3-Herbaceous  
 SYN= *Persicaria orientalis* (L.) Spach  
**Polygonum meisnerianum** var. *beyrichianum* (C. & S.) Meisn.—F3-Herbaceous  
**Polygonum scandens** L.  
**Polygonum persicaria** L.—F2-Herbaceous WATCH  
**Rumex acetosella** L.—F3-Herbaceous  
**Rumex conglomeratus** Murr.—F3-Herbaceous
- Rumex crispus** L.—F2-Herbaceous  
**Rumex obtusifolius** L.—F3-Herbaceous  
**Rumex paraguayensis** Parodi—F3-Herbaceous  
**Rumex pulcher** L.—F2-Herbaceous
- POLYPODIACEAE**  
**Nephrolepis exaltata** (L.) Schott—F3-Herbaceous
- PONTERIACEAE**  
**Eichhornia crassipes** (Mart.) Solms—F1-Woody
- POTAMOGETONACEAE**  
**Potamogeton crispus** L.—F2-Woody
- PRIMULACEAE**  
**Anagallis arvensis** L.—F2-Herbaceous
- PSILOTACEAE**  
**Psilotum nudum** (L.) P. Beauv.—F3-Herbaceous
- PTERIDACEAE**  
**Cheilanthes notholaenoides** (Desv.) Maxon ex Weatherby—F3-Herbaceous  
**Pteris multifida** Poir.—F3-Herbaceous  
**Pteris vittata** L.—F3-Herbaceous
- RANUNCULACEAE**  
**Adonis annua** L.—F3-Herbaceous  
**Clematis terniflora** DC.—F2-Herbaceous WATCH  
 SYN= *Clematis dioscoreifolia* Levl. & Vaniot  
**Consolida ajacis** (L.) Schur—F2-Herbaceous  
 SYN= *Delphinium ajacis* L.  
 SYN= *Delphinium ambiguum* L.  
**Consolida orientalis** (J. Gay) Schroedinger—F4-Herbaceous  
 SYN= *Delphinium orientale* J. Gay  
**Ranuncus ficaria** L.—F3-Herbaceous  
**Ranunculus marginatus** var. *trachycarpus* (Fisch. & Mey.) Arn.—F3-Herbaceous  
 SYN= *Ranunculus trachycarpus* Fisch. & Mey.  
**Ranunculus muricatus** L.—F2-Herbaceous  
**Ranunculus parviflorus** L.—F2-Herbaceous  
**Ranunculus platensis** Spreng.—F3-Herbaceous  
**Ranunculus repens** L.—F2-Herbaceous  
**Ranunculus sardous** Crantz—F2-Herbaceous  
 SYN= *Ranunculus parvulus* L.  
**Ranunculus trilobus** Desf.—F3-Herbaceous
- RHAMNACEAE**  
**Hovenia dulcis** Thunb.—F3-Woody  
**Paliurus spina-christi** P. Mill.—F3-Woody  
**Ziziphus zizyphus** (L.) Karst.—F3-Woody  
 SYN= *Ziziphus jujuba* P. Mill.
- ROSACEAE**  
**Aphanes microcarpa** (Boiss. & Reut.) Rothm.—F3-Herbaceous  
 SYN= *Alchemilla microcarpa* Boiss. & Reut.  
**Duchesnea indica** (Andr.) Focke—F2-Herbaceous  
**Photinia serratifolia** (Desf.) Kalkm.—F3-Woody WATCH  
**Potentilla recta** L.—F3-Herbaceous  
**Prunus domestica** L.—F3-Woody  
**Prunus persica** (L.) Batsch—F3-Woody  
**Pyracantha coccinea** M. Roemer—F3-Woody  
**Pyracantha fortuneana** (Maxim.) H.L. Li—F3-Woody



***Pyracantha koidzumii*** (Hayata) Rehder—F3-Woody

***Pyrus calleryana*** Dcne.—F2-Woody

***Pyrus communis*** L.—F3-Woody

***Rosa bracteata*** J.C. Wendl.—F1-Woody

***Rosa eglantheria*** L.—F3-Woody

***Rosa laevigata*** Michx.—F2-Woody

***Rosa micrantha*** Borrer ex Sm.—F3-Woody

***Rosa multiflora*** Thunb. ex Murr.—F1-Woody

***Rosa tomentosa*** Sm.—F3-Woody

***Rubus bifrons*** Vest ex Tratt.—F3-Herbaceous

#### RUBIACEAE

***Asperula arvensis*** L.—F3-Herbaceous

***Cruciata pedemontana*** (Bellardi) Ehrend.—F2-Herbaceous

syn= *Galium pedemontanum* (Bellardi) All.

***Galium anglicum*** Hudson—F3-Herbaceous

***Galium aparine*** L.—F2-Herbaceous

***Paederia foetida*** L.—F3-Woody

syn= *Paederia scandens* (Lour.) Merr.

***Richardia scabra*** L.—F2-Herbaceous

***Sherardia arvensis*** L.—F2-Herbaceous

***Spermacoce verticillata*** L.—F3-Herbaceous

syn= *Borreria verticillata* (L.) G.F.W. Mey.

#### RUTACEAE

***Citrus aurantium*** L.—F3-Woody

***Poncirus trifoliata*** (L.) Raf.—F2-Woody

***Ruta chalapensis*** L.—F3-Herbaceous

***Ruta graveolens*** L.—F3-Herbaceous

***Triphasia trifolia*** (Burm. f.) P. Wilson—F3-Woody

#### SALICACEAE

***Populus alba*** L.—F3-Woody

***Populus nigra*** L.—F3-Woody

syn= *Populus italica* (Du Roi) Moench

***Salix xpendulina*** Wenderoth—F3-Woody

syn= *Salix babylonica* auct. non L. p.p.

#### SALVINIACEAE

***Salvinia molesta*** Mitchell—F1-Woody

***Salvinia minima*** Baker—F2-Woody

#### SAPINDACEAE

***Cardiospermum halicacabum*** L.—F2-Herbaceous

***Cupaniopsis anacardioides*** (A. Rich.) Radlk.—F3-Woody

***Koelreuteria elegans*** (Seem.) A.C. Smith—F3-Woody

syn= *Koelreuteria paniculata* Laxm.

#### SCROPHULARIACEAE

***Bacopa repens*** (Sw.) Wettst.—F3-Herbaceous

***Bellardia trixago*** (L.) All.—F2-Herbaceous

***Chaenorhinum minus*** (L.) Lange—F3-Herbaceous

***Kickxia elatine*** (L.) Dumort.—F3-Herbaceous

***Limnophila sessiliflora*** (Vahl) Blume—F2-Woody

***Linaria vulgaris*** P. Mill.—F3-Herbaceous

***Lindernia crustacea*** (L.) F. Muell.—F3-Herbaceous

***Mazus pumilus*** (Burm. f.) Steenis—F2-Herbaceous

syn= *Mazus japonicus* (Thunb.) Kuntze

***Parentucellia viscosa*** (L.) Caruel—F2-Herbaceous

***Verbascum blattaria*** L.—F2-Herbaceous

***Verbascum thapsus*** L.—F2-Herbaceous

***Verbascum virgatum*** Stokes—F3-Herbaceous

***Veronica agrestis*** L.—F4-Herbaceous

***Veronica arvensis*** L.—F2-Herbaceous

***Veronica persica*** Poir.—F2-Herbaceous

***Veronica polita*** Fries—F2-Herbaceous

#### SIMAROUBACEAE

***Ailanthus altissima*** (P. Mill.) Swingle—F1-Woody

#### SOLANACEAE

***Cestrum diurnum*** L.—F3-Woody

***Cestrum nocturnum*** L.—F3-Woody

***Cestrum parqui*** L'Hér.—F3-Woody

***Datura innoxia*** P. Mill.—F3-Herbaceous

***Datura stramonium*** L.—F2-Herbaceous

***Lycianthes asarifolia*** (Kunth & Bouché) Bitter—F3-Herbaceous

***Lycium barbarum*** L.—F3-Woody

***Nicotiana glauca*** Graham—F2-Woody

***Nicotiana longiflora*** Cav.—F4-Herbaceous

***Nicotiana tabacum*** L.—F3-Herbaceous

***Nierembergia hippomanica*** Miers—F3-Herbaceous

***Petunia integrifolia*** (Hook.) Schinz & Thellung—F3-Herbaceous

syn= *Petunia violacea* Lindl.

***Physalis philadelphica*** Lam.—F4-Herbaceous

syn= *Physalis ixocarpa* Hornem.

***Salpichroa organifolia*** (Lam.) Baill.—F3-Herbaceous

syn= *Salpichroa rhomboidea* (Gillies & Hook.) Miers

***Schizanthus pinnatus*** Ruiz & Pavón—F4-Herbaceous

***Solanum capsicastrum*** Link ex Schauer—F3-Herbaceous

***Solanum capsicoides*** All.—F3-Herbaceous

***Solanum diphyllum*** L.—F3-Herbaceous

***Solanum erianthum*** D. Don—F3-Herbaceous

***Solanum lycopersicum*** var. ***cerasiforme*** (Dunal) Spooner et al.—F3-Herbaceous

syn= *Lycopersicon esculentum* var. *cerasiforme* (Dunal) Alef.

***Solanum lycopersicum*** Lam. var. ***lycopersicum***—F3-Herbaceous

syn= *Lycopersicon esculentum* P. Mill.

***Solanum pseudocapsicum*** L.—F3-Herbaceous

***Solanum sarrachoides*** Sendt.—F3-Herbaceous

***Solanum sisymbriifolium*** Lam.—F3-Herbaceous

***Solanum viarum*** Dunal—F1-Herbaceous

#### SPHENOCLEACEAE

***Sphenoclea zeylanica*** Gaertn.—F3-Herbaceous

#### STERCULIACEAE

***Firmiana simplex*** (L.) W. Wight—F3-Woody

***Melochia corchorifolia*** L.—F2-Herbaceous

#### TAMARICACEAE

***Tamarix aphylla*** (L.) Karst.—F1-Woody

***Tamarix chinensis*** Lour.—F1-Woody

including *T. pentandra* Pallas, *T. ramosissima* Ledeb.

***Tamarix gallica*** L.—F1-Woody

including *T. canariensis* Willd., *T. africana* Poir.

***Tamarix parviflora*** DC.—F1-Woody



## THELYPTERIDACEAE

**Macrothelypteris torresiana** (Gaud.) Ching—F3-Herbaceous

syn= *Dryopteris uliginosa* (Kunze) C. Christens.

syn= *Thelypteris torresiana* (Gaud.) Alston

## THYMELAEACEAE

**Thymelaea passerina** (L.) Coss. & Germ.—F3-Herbaceous

## ULMACEAE

**Ulmus parvifolia** Jacq.—F3-Woody WATCH

**Ulmus pumila** L.—F1-Woody

## URTICACEAE

**Boehmeria nivea** (L.) Gaud.—F4-Herbaceous

**Parietaria judaica** L.—F4-Herbaceous

**Pilea microphylla** (L.) Lieb.—F3-Herbaceous

**Urtica urens** L.—F3-Herbaceous

## VALERIANACEAE

**Valerianella locusta** (L.) Betcke—F3-Herbaceous

## VERBENACEAE

**Clerodendrum bungei** Steud.—F3-Woody

**Clerodendrum indicum** (L.) Kuntze—F3-Woody

**Duranta erecta** L.—F3-Woody

syn= *Duranta repens* L. var. *alba* (Mast.) Bailey

syn= *Duranta repens* var. *repens*

**Glandularia xhybrida** (Grönland & Rümpler) Nesom & Pruski—F4-Herbaceous

syn= *Verbena hybrida* Grönland & Rümpler

**Glandularia pulchella** (Sweet) Troncoso—F2-Herbaceous

syn= *Verbena pulchella* Sweet

syn= *Verbena tenuisecta* Briq.

**Lantana camara** L.—F2-Woody

**Lantana montevidensis** (Spreng.) Briq.—F3-Woody

syn= *Lantana sellowiana* Link & Otto

syn= *Lippia montevidensis* Spreng.

**Verbena bonariensis** L.—F2-Herbaceous

**Verbena brasiliensis** Vell.—F2-Herbaceous WATCH

**Verbena litoralis** Kunth—F4-Herbaceous

**Verbena rigida** Spreng.—F2-Herbaceous

**Vitex agnus-castus** L.—F2-Woody WATCH

**Vitex negundo** L.—F3-Woody

## VIOLACEAE

**Viola tricolor** L.—F3-Herbaceous

## VITACEAE

**Cayratia japonica** (Thunb.) Gagnepain—F3-Herbaceous

## ZYGOPHYLLACEAE

**Kallstroemia maxima** (L.) Hook. & Arn.—F3-Herbaceous

**Peganum harmala** L.—F2-Herbaceous

**Tribulus cistoides** L.—F4-Herbaceous

**Tribulus terrestris** L.—F2-Herbaceous

**Zygophyllum fabago** L.—F3-Herbaceous

## APPENDIX 2

Non-native species in Texas ranked as F1. For aquatic species, the number of counties of occurrence is indicated in square brackets.

## F1-WOODY (Trees, shrubs, subshrubs, and woody vines)

|                            |   |  |
|----------------------------|---|--|
| <b>Ailanthus altissima</b> | <b>Melia azedarach</b>  | <b>Tamarix gallica</b> (incl. <i>T. canariensis</i> , <i>T. africana</i> ) |
| <b>Arundo donax</b>        | <b>Nandina domestica</b>  | <b>Tamarix parviflora</b>  |
| <b>Ligustrum lucidum</b>   | <b>Rosa bracteata</b>   | <b>Triadica sebifera</b>   |
| <b>Ligustrum quihoui</b>   | <b>Rosa multiflora</b>  | <b>Ulmus pumila</b>  |
| <b>Ligustrum sinense</b>   | <b>Tamarix aphylla</b>  | <b>Wisteria sinensis</b>   |
| <b>Lonicera japonica</b>   | <b>Tamarix chinensis</b> (incl. <i>T. pentandra</i> , <i>T. ramosissima</i> ) |  |

## F1-HERBACEOUS (Annual and perennial herbs and grasses)

|   |                               |   |
|---|-------------------------------|---|
| <b>Atriplex semibaccata</b>                         | <b>Dichanthium annulatum</b>  | <b>Melilotus officinalis</b>              |
| <b>Bassia scoparia</b>                              | <b>Dichanthium aristatum</b>  | <b>Orobanche ramosa</b>                   |
| <b>Bothriochloa ischaemum</b> var. <i>songarica</i> | <b>Dichanthium sericeum</b>   | <b>Pennisetum ciliare</b>                 |
| <b>Carduus nutans</b> subsp. <i>macrocephalus</i>   | <b>Eragrostis lehmanniana</b> | <b>Rapistrum rugosum</b>                  |
| <b>Centaurea melitensis</b>                         | <b>Lolium perenne</b>         | <b>Salsola kali</b> subsp. <i>pontica</i> |
| <b>Cynodon dactylon</b>                             | <b>Lygodium japonicum</b>     | <b>Salsola tragus</b>                     |
| <b>Cyperus entrerianus</b>                          | <b>Marrubium vulgare</b>      | <b>Solanum viarum</b>                     |
|   | <b>Melilotus albus</b>        | <b>Sorghum halepense</b>                  |
|   | <b>Melilotus indicus</b>      | <b>Urochloa maxima</b>                    |

## F1-AQUATIC

|  |                                    |                                       |
|--|------------------------------------|---------------------------------------|
| <b>Alternanthera philoxeroides</b> [20+] | <b>Hydrilla verticillata</b> [6]   | <b>Nasturtium officinale</b> [35]     |
| <b>Colocasia esculenta</b> [11]          | <b>Myriophyllum aquaticum</b> [18] | <b>Pistia stratiotes</b> [10 or more] |
| <b>Eichhornia crassipes</b> [25]         | <b>Myriophyllum spicatum</b> [10]  | <b>Salvinia molesta</b> [10]          |



## APPENDIX 3

Non-native species in Texas ranked as F2. For aquatic species, the number of counties of known occurrence is indicated in square brackets.

## F2-WOODY (Trees, shrubs, subshrubs, and woody vines)

|                                |  |                           |
|--------------------------------|--|---------------------------|
| <i>Albizia julibrissin</i>     | <i>Morus alba</i>                          | <i>Pyrus calleryana</i>   |
| <i>Broussonetia papyrifera</i> | <i>Nicotiana glauca</i>                    | <i>Rosa laevigata</i>     |
| <i>Hypericum perforatum</i>    | <i>Phyllostachys aurea</i>                 | <i>Vitex agnus-castus</i> |
| <i>Lagerstroemia indica</i>    | <i>Poncirus trifoliata</i>                 |                           |
| <i>Lantana camara</i>          | <i>Pueraria montana</i> var. <i>lobata</i> |                           |

## F2-HERBACEOUS (Annual and perennial herbs and grasses)

|                                  |   |   |
|----------------------------------|---|---|
| <i>Aegilops cylindrica</i>       | <i>Conringia orientalis</i>                 | <i>Gamochaeta pensylvanica</i>                        |
| <i>Aira caryophyllea</i>         | <i>Consolida ajacis</i>                     | <i>Geranium dissectum</i>                             |
| <i>Alternanthera caracasana</i>  | <i>Convolvulus arvensis</i>                 | <i>Gibasis pellucida</i>                              |
| <i>Amaranthus blitum</i>         | <i>Conyza bonariensis</i>                   | <i>Glandularia pulchella</i>                          |
| <i>Ammi majus</i>                | <i>Coronilla varia</i>                      | <i>Gomphrena globosa</i>                              |
| <i>Anagallis arvensis</i>        | <i>Coronopus didymus</i>                    | <i>Hedera helix</i>                                   |
| <i>Anthemis cotula</i>           | <i>Croton argenteus</i>                     | <i>Hedypnois cretica</i>                              |
| <i>Anthoxanthum odoratum</i>     | <i>Cruciata pedemontana</i>                 | <i>Heliotropium amplexicaule</i>                      |
| <i>Arabidopsis thaliana</i>      | <i>Cucumis melo</i>                         | <i>Heliotropium indicum</i>                           |
| <i>Arenaria serpyllifolia</i>    | <i>Cuphea carthagenensis</i>                | <i>Holosteum umbellatum</i>                           |
| <i>Avena fatua</i>               | <i>Cyclosporum leptophyllum</i>             | <i>Hordeum murinum</i> subsp. <i>leporinum</i>        |
| <i>Bellardia trixago</i>         | <i>Cyperus difformis</i>                    | <i>Hypochaeris brasiliensis</i> var. <i>tweediei</i>  |
| <i>Brassica rapa</i>             | <i>Cyperus involucratus</i>                 | <i>Hypochaeris glabra</i>                             |
| <i>Briza minor</i>               | <i>Cyperus iria</i>                         | <i>Hypochaeris microcephala</i> var. <i>albiflora</i> |
| <i>Bromus arvensis</i>           | <i>Cyperus rotundus</i>                     | <i>Hypochaeris radicata</i>                           |
| <i>Bromus catharticus</i>        | <i>Dactylis glomerata</i>                   | <i>Ipomoea carnea</i>                                 |
| <i>Bromus hordeaceus</i>         | <i>Dactyloctenium aegyptium</i>             | <i>Juncus capitatus</i>                               |
| <i>Bromus japonicus</i>          | <i>Datura stramonium</i>                    | <i>Kummerowia striata</i>                             |
| <i>Bromus rubens</i>             | <i>Daucus carota</i>                        | <i>Lactuca serriola</i>                               |
| <i>Bromus secalinus</i>          | <i>Descurainia sophia</i>                   | <i>Lamium amplexicaule</i>                            |
| <i>Bromus tectorum</i>           | <i>Desmazeria rigida</i>                    | <i>Lamium purpureum</i>                               |
| <i>Buglossoides arvensis</i>     | <i>Digitaria ischaemum</i>                  | <i>Lathyrus hirsutus</i>                              |
| <i>Bupleurum rotundifolium</i>   | <i>Digitaria sanguinalis</i>                | <i>Leonotis nepetifolia</i>                           |
| <i>Camelina microcarpa</i>       | <i>Digitaria violascens</i>                 | <i>Lespedeza cuneata</i>                              |
| <i>Capsella bursa-pastoris</i>   | <i>Diploaxis muralis</i>                    | <i>Leucanthemum vulgare</i>                           |
| <i>Cardamine debilis</i>         | <i>Duchesnea indica</i>                     | <i>Lolium arundinaceum</i>                            |
| <i>Cardamine hirsuta</i>         | <i>Echinochloa colona</i>                   | <i>Lolium temulentum</i>                              |
| <i>Cardiospermum halicacabum</i> | <i>Echinochloa crus-galli</i>               | <i>Malva neglecta</i>                                 |
| <i>Carduus pycnocephalus</i>     | <i>Eleusine indica</i>                      | <i>Malva parviflora</i>                               |
| <i>Centaurea cyanus</i>          | <i>Elymus hispidus</i>                      | <i>Malvastrum coromandelianum</i>                     |
| <i>Centaureum muhlenbergii</i>   | <i>Eragrostis barrelieri</i>                | <i>Mazus pumilus</i>                                  |
| <i>Centaureum pulchellum</i>     | <i>Eragrostis cilianensis</i>               | <i>Medicago arabica</i>                               |
| <i>Cerastium fontanum</i>        | <i>Eragrostis curvula</i>                   | <i>Medicago lupulina</i>                              |
| <i>Cerastium glomeratum</i>      | <i>Eragrostis pilosa</i> var. <i>pilosa</i> | <i>Medicago minima</i>                                |
| <i>Cerastium pumilum</i>         | <i>Erodium cicutarium</i>                   | <i>Medicago orbicularis</i>                           |
| <i>Chenopodium album</i>         | <i>Eruca vesicaria</i> subsp. <i>sativa</i> | <i>Medicago polymorpha</i>                            |
| <i>Chenopodium ambrosioides</i>  | <i>Erucastrum gallicum</i>                  | <i>Medicago sativa</i>                                |
| <i>Chenopodium murale</i>        | <i>Erysimum repandum</i>                    | <i>Melinis repens</i>                                 |
| <i>Chloris cantherae</i>         | <i>Eustachys retusa</i>                     | <i>Melochia corchorifolia</i>                         |
| <i>Chloris gayana</i>            | <i>Facelis retusa</i>                       | <i>Mollugo cerviana</i>                               |
| <i>Chorisporea tenella</i>       | <i>Fatoua villosa</i>                       | <i>Murdannia nudiflora</i>                            |
| <i>Cichorium intybus</i>         | <i>Galinsoga parviflora</i>                 | <i>Oenothera cordata</i>                              |
| <i>Cirsium vulgare</i>           | <i>Galium aparine</i>                       | <i>Onopordum acanthium</i>                            |
| <i>Clematis terniflora</i>       | <i>Gamochaeta antillana</i>                 | <i>Oryza sativa</i>                                   |
| <i>Commelina communis</i>        | <i>Gamochaeta calviceps</i>                 |   |
| <i>Conium maculatum</i>          | <i>Gamochaeta coarctata</i>                 |   |



|                                       |   |  |
|---------------------------------------|---|--|
| <i>Oxalis articulata</i>              | <i>Richardia scabra</i>                                   | <i>Thlaspi arvense</i>                     |
| <i>Oxalis debilis</i>                 | <i>Ricinus communis</i>                                   | <i>Torilis arvensis</i>                    |
| <i>Panicum antidotale</i>             | <i>Rumex crispus</i>                                      | <i>Torilis nodosa</i>                      |
| <i>Panicum bergii</i>                 | <i>Rumex pulcher</i>                                      | <i>Tragopogon dubius</i>                   |
| <i>Panicum coloratum</i>              | <i>Scabiosa atropurpurea</i>                              | <i>Tragopogon porrifolius</i>              |
| <i>Parapholis incurva</i>             | <i>Sclerochloa dura</i>                                   | <i>Tribulus terrestris</i>                 |
| <i>Parentucellia viscosa</i>          | <i>Scorzonera laciniata</i>                               | <i>Trifolium dubium</i>                    |
| <i>Paspalum dilatatum</i>             | <i>Senecio vulgaris</i>                                   | <i>Trifolium incarnatum</i>                |
| <i>Paspalum notatum</i>               | <i>Senna occidentalis</i>                                 | <i>Trifolium polymorphum</i>               |
| <i>Paspalum urvillei</i>              | <i>Sesbania emerus</i>                                    | <i>Trifolium repens</i>                    |
| <i>Peganum harmala</i>                | <i>Setaria italica</i>                                    | <i>Trifolium resupinatum</i>               |
| <i>Pennisetum villosum</i>            | <i>Setaria pumila</i>                                     | <i>Trifolium vesiculosum</i>               |
| <i>Perilla frutescens</i>             | <i>Setaria verticillata</i>                               | <i>Urochloa reptans</i>                    |
| <i>Petrorhagia dubia</i>              | <i>Setaria viridis</i>                                    | <i>Vaccaria hispanica</i>                  |
| <i>Phyllanthus urinaria</i>           | <i>Sherardia arvensis</i>                                 | <i>Vaccaria pyramidata</i>                 |
| <i>Plantago lanceolata</i>            | <i>Silene gallica</i>                                     | <i>Verbascum blattaria</i>                 |
| <i>Plantago major</i>                 | <i>Sinapis arvensis</i>                                   | <i>Verbascum thapsus</i>                   |
| <i>Poa annua</i>                      | <i>Sisymbrium altissimum</i>                              | <i>Verbena bonariensis</i>                 |
| <i>Polycarpon tetraphyllum</i>        | <i>Sisymbrium irio</i>                                    | <i>Verbena brasiliensis</i>                |
| <i>Polygonum arenastrum</i>           | <i>Sisymbrium officinale</i>                              | <i>Verbena rigida</i>                      |
| <i>Polygonum aviculare</i>            | <i>Solivia anthemiifolia</i>                              | <i>Veronica arvensis</i>                   |
| <i>Polygonum convolvulus</i>          | <i>Soliva sessilis</i>                                    | <i>Veronica persica</i>                    |
| <i>Polygonum persicaria</i>           | <i>Soliva stolonifera</i>                                 | <i>Veronica polita</i>                     |
| <i>Polypogon monspeliensis</i>        | <i>Sonchus asper</i>                                      | <i>Vicia sativa</i> subsp. <i>nigra</i>    |
| <i>Polypogon viridis</i>              | <i>Sonchus oleraceus</i>                                  | <i>Vicia tetrasperma</i>                   |
| <i>Prunella vulgaris</i>              | <i>Sorghum bicolor</i>                                    | <i>Vicia villosa</i> subsp. <i>villosa</i> |
| <i>Pseudognaphalium luteoalbum</i>    | <i>Stachys floridana</i>                                  | <i>Vinca major</i>                         |
| <i>Ranunculus muricatus</i>           | <i>Stellaria media</i>                                    | <i>Vulpia myuros</i>                       |
| <i>Ranunculus parviflorus</i>         | <i>Stellaria pallida</i>                                  | <i>Xanthium spinosum</i>                   |
| <i>Ranunculus repens</i>              | <i>Taraxacum laevigatum</i>                               | <i>Youngia japonica</i>                    |
| <i>Ranunculus sardous</i>             | <i>Taraxacum officinale</i>                               |  |
|                                       | <b>F2-AQUATIC</b>   |  |
| <i>Ceratopteris thalictroides</i> [3] | <i>Limnophila sessiliflora</i> [2]                        | <i>Nymphoides indica</i> [1]               |
| <i>Cryptocoryne beckettii</i> [1]     | <i>Ludwigia grandiflora</i> subsp. <i>grandiflora</i> [3] | <i>Nymphoides peltata</i> [2]              |
| <i>Egeria densa</i> [3]               | <i>Ludwigia grandiflora</i> subsp. <i>hexapetala</i> [9]  | <i>Ottelia alismoides</i> [1]              |
| <i>Hydrocleys nymphoides</i> [2]      | <i>Nomaphila stricta</i> [1]                              | <i>Potamogeton crispus</i> [8]             |
| <i>Hygrophila polysperma</i> [2]      |   | <i>Salvinia minima</i> [2]                 |
| <i>Landoltia punctata</i> [6]         |   | <i>Xanthosoma sagittifolium</i> [1]        |

## APPENDIX 4

Watch List: non-native species in Texas potentially ranked as F1. All F2 aquatic species are included.

## From F2-WOODY:

*Pyrus calleryana*

*Vitex agnus-castus*

## From F3-WOODY:

*Leucaena leucocephala*

*Pistacia chinensis*

*Lonicera maackii*

*Schinus molle*

*Macfadyena unguis-cati*

*Schinus terebinthifolius*

*Photinia serratifolia*

*Ulmus parvifolia*

## From F2-HERBACEOUS:

*Perilla frutescens*

*Torilis arvensis*

*Polygonum arenastrum*

*Verbena brasiliensis*

*Polygonum persicaria*

*Stachys floridana*

*Hypericum perforatum*  
*Pueraria montana* var. *lobata*

*Ardisia crenata*  
*Casuarina equisetifolia*  
*Cinnamomum camphora*  
*Elaeagnus angustifolia*

*Carduus tenuiflorus*  
*Cirsium vulgare*  
*Clematis terniflora*  
*Lespedeza cuneata*



|                                   |   |                                 |
|-----------------------------------|---|---------------------------------|
|                                   | <b>From F3-HERBACEOUS:</b>  |                                 |
| <b>Cryptostegia grandiflora</b>   | <b>Imperata cylindrica</b>  | <b>Microstegium vimineum</b>    |
|                                   | <b>from F2-AQUATIC:</b>   |                                 |
| <b>Ceratopteris thalictroides</b> | <b>Limnophila sessiliflora</b>  | <b>Nymphoides indica</b>        |
| <b>Cryptocoryne beckettii</b>     | <b>Ludwigia grandiflora</b> subsp. <b>gran-</b>   | <b>Nymphoides peltata</b>       |
| <b>Egeria densa</b>               | <b>diflora</b>  | <b>Ottelia alismoides</b>       |
| <b>Hydrocleys nymphoides</b>      | <b>Ludwigia grandiflora</b> subsp. <b>hexa-</b>   | <b>Potamogeton crispus</b>      |
| <b>Hygrophila polysperma</b>      | <b>petala</b>   | <b>Salvinia minima</b>          |
| <b>Landoltia punctata</b>         | <b>Nomaphila stricta</b>  | <b>Xanthosoma sagittifolium</b> |
|                                   | <b>Potential and expanding new arrivals with global warming in south and coastal Texas:</b> |                                 |
| <b>Caesalpinia bonduc</b>         | <b>Conocarpus erectus</b>   | <b>Rhizophora mangle</b>        |
| <b>Canavalia rosea</b>            | <b>Laguncularia racemosa</b>  | <b>Scaveola plumieri</b>        |
| <b>Cassytha filiformis</b>        |   |                                 |

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**Postscript.**—Since preparation of this report, various minor changes have been made to the lists. The whole set of information on Texas non-native plants, including these changes and additional commentary, is posted on the internet—see “Non-natives” at <<http://www.guynesom.com/Texasplantsweb.htm>>. The internet information is frequently updated as new data become available and as reassessments are made. In order to reflect the input of Texas botanists to the genesis and development of the information, the set of online data is cited as below.

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The total number of non-native plants species in Texas now is 820 and a relatively small number of rankings have been modified. The Watch List has been expanded with additions of these: *Acroptilon repens*, *Carduus acanthoides*, *Cayratia japonica*, *Colocasia esculenta*, *Cortaderia selloana*, *Dioscorea bulbifera*, *Elymus repens*, *Gibasis pellucida*, *Lespedeza bicolor*, *Lolium arundinaceum*, and *Pyracantha koidzumii*. As with many of the F1 and F2 species, some of the Watch List species already are so widespread that it is unlikely that they can be eradicated or even controlled except by sustained efforts on local levels. From among the Watch List species, a subset is indicated as a “**Super Watch List**,” those species that perhaps can be removed from the Texas landscape before they become impossible to control. A newly added **Expected List** records species not currently known with certainty in Texas but that occur in nearby areas—each of these is aggressively invasive and ecologically damaging, and there is a high probability that each soon will reach Texas: *Alliaria petiolata*, *Ampelopsis brevipedunculata*, *Berberis thunbergii*, *Celastrus orbiculatus*, *Centaurea stoebe* ssp. *micranthos*, *Centaurea solstitialis*, *Cirsium arvense*, *Dioscorea alata*, *Elaeagnus pungens*, *Elaeagnus umbellata*, *Euonymus alatus*, *Euonymus fortunei*, *Euphorbia esula*, *Halogeton glomeratus*, *Lonicera morrowii*, *Lygodium microphyllum*, *Melaleuca quinquenervia*, *Miscanthus sinensis*, *Phalaris aquatica*, *Pennisetum setaceum*, *Polygonum cuspidatum*, *Schismus arabicus*, *Setaria faberi*, *Typha angustifolia*, and *Wisteria floribunda*.